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68th ANNUAL MEETING

UNIVERSITY OF CENTRAL FLORIDA

Orlando, Florida
MARCH 11-13, 2004

ISSN: 0098-4590

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2004 PROGRAM ISSUE

THE SIXTY-EIGHTH ANNUAL MEETING OF THE FLORIDA ACADEMY OF SCIENCES

in conjunction with the
Florida Junior Academy of Science
and the Science Talent Search

University of Central Florida
Orlando
March 11-13, 2004

Medalist Address

“*From Industry to Academia and their Ultimate Merger*”
by Dr. Christian Clausen

Gale Plenary Lecture

“*Magick and Mayhem, Those Marvelous Women of Science*”
by Dr. Catherine Cobb

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FAS PRESIDENT'S WELCOME

It is indeed a pleasure to welcome all participants to the Sixty-seventh Annual Meeting of the Florida Academy of Sciences. This year's meeting is hosted by the University of Central Florida. We are very grateful to the UCF administration, staff, faculty and participating students for their preparations. We look forward to a profitable and enjoyable meeting.

The Florida Academy of Sciences has the distinction of serving as the only scientific society in the State with the mission of embracing all the disciplines in the field. This emphasis enables us to bring together representatives from many branches of science to concentrate on a single issue of statewide importance.

Dr. Cherie Geiger

MEETING INFORMATION

The 68th Annual Meeting of the Florida Academy of Sciences will be held at the University of Central Florida in Orlando, Florida from March 11-13, 2004. Abstracts on all aspects of science are solicited for general sessions in all Sections of the Academy (list of Sections on back of front page). One special Sessions is planned, and additional ones are encouraged. Any person or Section interested in organizing a Special Session should contact the appropriate Section Chair or the Program Chair for further information.

LOCATION

UCF's main campus is located 13 miles east of downtown Orlando at 4000 Central Florida Blvd. Below are several routes for easy access to the campus. From I-4 West (Tampa): Exit 72 (old exit 28) onto east 528 (Toll Road). Go past Orlando International Airport to 417 north. Take 417 north (Toll Road) to exit 37 on University Blvd. Exit east onto University Blvd. to UCF. From I-4 East (Daytona Beach): Exit 94 (old exit 49) onto FL 434 east. Go through Longwood, Winter Springs, and Oviedo on FL 434 to UCF. From South on Turnpike: Exit 254 (Orlando South - 441). Take first right onto east 528 (Toll Road). Go east past Orlando International Airport to 417. Take 417 north (Toll Road) to exit 37 -University Blvd. Exit east onto University Blvd. to UCF. From North on Turnpike: Exit 267 onto east 408 (Toll Road). Go east through Orlando to merge with 417. Take 417 north to exit 37 - University Blvd. Exit east onto University Blvd. to UCF.

UCF was originally established by the state legislature in June of 1963 under the name of Florida Technology University as a state university serving the counties of east central Florida (Flagler, Orange, Seminole, Lake, Brevard, Volusia, Osceola, Indian River, and St. Lucie). Classes began in October 1968 with an initial enrollment of 1, 948 students. In 1978, the school's name was changed to the University of Central Florida, and by the fall of 2001, it boasted a total of 36, 013 students, making it one of the largest of the 11 public universities in the state. The former technological university now offers 76 Baccalaureate, 62 Masters's, 20 Doctoral, and 3 Specialist Programs. UCF is a co-educational institution and houses a diverse community on several campuses. A total of 1,228 full and part-time faculty, along with 1,159 executive, administrative and support staff serve the student community. The main campus comprises 102 buildings on 1,415 acres just 13 miles east of downtown Orlando. The other campuses are: UCF downtown Orlando, Central Florida Research Park in Orlando, UCF Professional Development Center in Orlando, the UCF Higher Education Center at Daytona Beach, the Clark Maxwell Jr. Lifelong Learning Center at Cocoa, and the Florida Solar Energy Center in Cocoa. For more information on UCF please visit the university website at www.ucf.edu.

REGISTRATION

ALL PARTICIPANTS MUST REGISTER but you need not be a member in order to present a paper or poster. Participants are urged to register early using the online form. Academy members will receive a Program Preview by mail, as will non-members who register before February 1, 2004. The Program Issue of the Florida Scientist (Supplement 1 to Volume 67) will be available at the Registration Desk, which will be open all day on Friday (beginning at 7:30 a.m., March 12 and Saturday, March 13, beginning at 7:30 a.m.

PARKING

Please use only designated parking (11-12 March, use Parking Lot E3 and the East Garage; 13 March, use Parking Lot E3, G1 or H1). For more information, see http://www.ucf.edu/campusmap/parking.html.

LODGING

No reservations can be made through the Academy. The following hotels are nearby and may have so-called "*UCF rates*" if you identify yourself with the FAS meeting. Prices listed are approximate and may show seasonal variation. Early reservations are a must at this time of year.

- Holiday Inn Select Orlando East-UCF: this will be the main conference hotel (ask for the FAS room block). Located one block from UCF. www.hiecf.com, 12125 High Tech Avenue, Orlando, FL 32817, 407-275-9000-UCF Rate $75.00 (reservations must be made by 2/19/04 to ensure availability)

- Radisson University Hotel Orlando. This hotel will be the main conference hotel. Ask for the FAS room block. Located two miles south of UCF. Free transportation to UCF. 1724 Alafaya Trail, Orlando, FL, 32826, www.radisson.com/orlandofl_university, 407-658-9008-UCF Rate $79.00
- Hilton Garden Inn Orlando East/UCF. Located 1 ½ miles south of UCF. www.orlandoeastucf.gardeninn.com, 1959 N. Alafaya Trail, Orlando, FL 32826, 407-992-5000-UCF Rate $85.00
- Courtyard at UCF Orlando East. Located 1 mile from UCF. www.courtyard.com, 12000 Collegiate Way, Orlando, FL, 32817 407-277-7676, UCF rate: $79.00.

MEALS

The Academy Banquet will be held on Friday evening, March 12, in the University Ballroom, at the Holiday Inn Select Orlando East. Dinner commences at 7 p.m. and will include a choice of Roast Prime Rib, Grilled Mahi Mahi, or Vegetable Lasagna. Pre-registration for the banquet is recommended as only a limited number of tickets will be available on the day of registration. Various eating facilities will be open on Friday in the Student Union across the street from the Engineering Building (Subway, Sbarro's, Baja Burrito, Wackoodees Grill and Bar, etc.). There are also numerous restaurants near UCF on University Blvd. Further information will be available at the Registration desk.

BUSINESS MEETING & PLENARY SESSION

The Gale Plenary Address will be given on Friday, March 12, at 1:00 p.m. immediately following the 12:30 p.m. FAS Annual Business Meeting. Dr. Catherine Cobb (University of South Carolina-Aiken) will present "*Magick and Mayhem, Those Marvelous Women of Science.*" Dr. Cobb is a *Sigma Xi* tour speaker, and UCF *Sigma Xi* is sponsoring her appearance in celebration of Womens' History Month and the FAS annual meeting.

MEDALLIST PRESENTATION

Dr. Christian Clausen, the 2003 Academy Medalist, will present the Annual Medalist Address titled "*From Industry to Academia and their Ultimate Merger*" immediately following the Banquet Friday evening. Dr. Clausen is Professor of Chemistry at University of Central Florida.

Dr. Jerald T. Milanich (Florida Museum of Natural History, and University of Florida) has been selected as the 2004 Academy Medalist.

FIELD TRIPS

Special field trips being run in connection with the Annual Meeting will be announced in the Program Preview, to be mailed in February. For information concerning local attractions check at the Registration Desk.

LOCAL ARRANGEMENTS

The Local Arrangements Co-Chairs for the Annual Meeting are Dr. Cherie Geiger, Dr. I. Jack Stout, Dr. Linda Walters, and Ms. Fran Ragsdale, all from the University of Central Florida (please see contact information in the section chair list on the inside front cover of this program). They may be consulted for any special meeting needs.

FLORIDA JR. ACADEMY OF SCIENCE ANNUAL COMPETITION

The Junior Academy will meet with Florida Academy of Sciences this year. As the student division of FAS, the Florida Junior Academy of Science provides opportunities that encourage middle and high school students in science by allowing them to compete, share, and network with other students and adults having common interests. The focus of this "common bond" among participants is their research activities. The Florida Junior Academy of Science is seeking volunteers to assist in judging and to act as section moderators at its meeting, to be held on Saturday, March 22nd. The Junior Academy is also seeking individuals in early February of 2003 to evaluate research papers submitted for this meeting. Persons interested in participating in this rewarding experience should contact the FJAS Coordinator: Ms. Patricia Zalo, 2812 26th Avenue Drive W., Bradenton, FL 34205-3707, telephone 941-756-4156, email pzalo@yahoo.com

COMMERCIAL AND INSTITUTIONAL EXHIBITS

Space is available on a first come-first served basis for a fee of $150.00. Exhibits by research institutions or organizations offering programs of an informational nature may be given free space. Parties interested in fee or free spaces should contact the Local Arrangements Chair for details.

NOMINATIONS FOR THE FLORIDA ACADEMY OF SCIENCES MEDAL RECIPIENT

The Florida Academy of Sciences encourages its members to submit formal nominations for candidates to be considered for the 2003 Medalist Award. Nomination Procedure: complete the Nomination Form and mail to Dr. Maribeth Durst, Chair, Medalist Selection Committee, Saint Leo University, Saint Leo, FL 33574 (campus email address:

maribeth.durst@saintleo.edu). Nomination forms must arrive no later than October 31, 2002. Criteria: The Florida Academy of Sciences Medal is presented each year at the Annual Meeting to a resident of the State of Florida, who has contributed in an outstanding manner to the promotion of scientific research, to the stimulation of interest in the sciences, or to the diffusion of scientific knowledge. The candidate need not be a Ph.D. He or she may be a research scientist, a philanthropist, an educator, a journalist, a science fair coordinator, a member of industry, government, or other organization, who has met the above criteria.

STUDENT AWARDS

Students presenting papers at the Annual Meeting of the Academy, and who are registered for the Meeting, may be considered for a number of awards. Details are presented below. Students wishing to be considered for one or more of these awards should indicate their interest on the Abstract Submittal Form. Dr. Sanjay Sesodia is the FAS Awards Chair, and he can be reached at: Graduate Medical Sciences, Barry University, 11300 NE 2nd Ave, Miami Shores, Fl 33161 (email: ssesodia@mail.barry.edu).

- ***Outstanding Student Papers Award*** - This award is presented by any of the Academy Sections to graduate and/or undergraduate students.
- ***American Association for the Advancement of Science Award*** - This award is presented to one male and one female undergraduate student annually and is a one-year membership in AAAS including the journal Science.
- ***Sigma Xi Awards*** - The first award, presented by the University of Florida chapter of *Sigma Xi*, is for $50 and a certificate. This award is presented to graduate students only. The second award is presented by Florida Institute of Technology for the best paper by a Florida Tech student. The award is for $50 and $100 for undergraduate and graduate students respectively. The third award, presented by the University of Central Florida chapter, is for the best paper by a UCF undergraduate ($50) and graduate student ($50).
- ***William W. Behrens, Jr./Florida Institute of Oceanography Award*** - This $750 prize is awarded by the Florida Institute of Oceanography to a graduate student for the best paper in any area of ocean or marine sciences. A written manuscript is required and must be submitted by February 12, 2004 to: Dr. Sanjay Sesodia, Chairman, FAS Awards Committee. Please, no facsimile or email submittals.

ANNOUNCEMENTS

The 69th Annual Meeting of FAS (2005) has been scheduled for 19-20 March 2005, at the University of South Florida.

PERMANENT OFFICES FOR THE ACADEMY

The FAS office is located at the Orlando Science Center:

Florida Academy of Sciences
Orlando Science Center
777 East Princeton St.
Orlando, FL 32803
407-514-2079

FLORIDA ACADEMY OF SCIENCES
2004 ANNUAL MEETING PROGRAM SUMMARY

TIME	EVENT
Thursday, 11 March 7:00 p.m.	FAS Council Meeting, - Holiday Inn Select Orlando East-UCF (room TBA)
Friday, 12 March 7:30 a.m. – 4:00 p.m.	FAS Registration & Information Desk, Lobby of Engineering Building-2
Friday, 12 March 8:00 a.m. – 12:30 a.m.	FAS Concurrent Paper Sessions (see Registration Desk for room locations)
Friday, 12 March 12:00 p.m. – 12:30 p.m.	Lunch (information at FAS Registration Desk)
Friday, 12 March 12:30 p.m. – 2:00 p.m.	Business Meeting & Gale Plenary Lecture, Engineering Building-2 102
Friday, 12 March 2:30 p.m. – 5:00 p.m.	FAS Concurrent Paper Sessions (see Registration Desk for room locations)
Friday, 12 March 7:00 p.m. – 10:00 p.m.	FAS Banquet & Medalist Address, in the University Ballroom, at the Holiday Inn Select Orlando East
Saturday, 13 March 7:30 a.m. – 12:00 p.m.	FAS Registration & Information Desk, Lobby of Engineering Building-2
Saturday, 13 March 8:30 a.m. – 1:00 p.m	FAS Concurrent Paper Sessions (see Registration Desk for Room Locations)
Saturday, 13 March 8:30 a.m. – 4:30 p.m	Junior Academy of Science Annual Meeting (UCF COMM Building, see Registration Desk for Room Locations)
Saturday, 13 March 12:00 – 2:00 p.m	Lunch on your own at local restaurants (information at Registration Desk)
Saturday, 13 March AFTERNOON	Trips to various local attractions (information at Registration Desk)

AGRICULTURAL AND NATURAL RESOURCES

FRIDAY 8:00 a.m. – ENGINEERING BUILDING-1 224
MARTIN ADJEI, UNIVERSITY OF FLORIDA, presiding

8:00 a.m. AGR-1 Variety selection of snap bean for fall planting in North Florida. B.N. WILLIAMS, R.N. GALLAHER, and A.R. BLOUNT. Univ. of Florida, Gainesville, FL 32611. Snap bean (*Phaseolous vulgaris* L.) is a popular vegetable in home gardens throughout the USA. The objective of this research was to test varieties of snap bean for yield when planted during late August or early September. Each year five varieties were tested using randomized complete block designs with five replications. Some varieties were tested all five years ('Roma II', 'Contender', and 'Blue Lake') while others were only tested for four years (Kentucky 135) or three years ('Golden Top Wax'). In all cases a year x variety interaction occurred for yield. The sum total of all harvests (4, 3, or 2 depending upon the year) will be discussed. Blue Lake, one of the highest yielding varieties, had yields ranging from 919 to 1371 g m^{-2} for 1999 and 2001, respectively. Contender and Roma II gave more harvestable beans early but Blue Lake sustained harvestable beans over a longer period of time. All varieties would be suitable for home gardening in North Florida.

8:15 a.m. AGR-2 Development of an alternate genetic transformation system for *Vitis*. M. DUTT, Z. LI, and D.J. GRAY. Mid Florida Research and Education Center, Univ. of Florida, Apopka, FL, 32703. *Agrobacterium* mediated transformation in *Vitis* sp. (grape) is routinely carried out using somatic embryos derived from proembryogenic masses (PEM). However initiation and proliferation of PEM is laborious and genotype dependent in that somatic embryogenesis cannot be obtained from all *Vitis* species and cultivars. Among those genotypes that produce PEM, proliferation and culture maintenance is often difficult-to-impossible. An alternate transformation method utilizing in vitro shoot (microprop) cultures is being explored. Such cultures are easier to maintain when compared to embryogenic cultures and there is less genotypic variation in response. Genetic constructs containing neomycin phosphotransferase (nptII) and green fluorescent protein (GFP) genes are being utilized to select transgenic tissues from *Agrobacterium* infected microprop cultures. The nptII gene allows selection of transgenic tissue using antibiotics such as kanamycin and GFP provides non-destructive visualization of transformed cells and tissues. To date, stable transgenic shoots were produced within two months after transformation. Procedures to optimize transformation of microprop cultures from a range of *Vitis* species and cultivars are being developed.

8:30 a.m. AGR-3 Sweet corn (*Zea mays* L.) yield affected by Cowpea (*Vigna unguiculata* L.) mulch. B.Y. BRACHO, R.N. GALLAHER, and R. MCSORLEY. Univ. of Florida. Gainesville, FL 32611. Corn is the third most important crop in the world, after wheat (*Triticum aestivum* L.) and rice (*Oriza sativa* L.). Legume mulch is a good source of N and organic matter. The objective of this study was to test five cowpea ('Cream 40') mulch rates for production of a promising late season sweet corn hybrid ('8102R' from Abbot & Cobb). An experiment was conducted with five mulch rates (0, 2.2, 4.4, 6.6, and 8.8 kg fresh cowpea m^{-2}, based on 0, 67, 134, 201, and 268 kg N content ha^{-1}) in a randomized complete block design. Data were collected on fresh ear yields. Low mulch rates produced more small ears than higher rates, while more fancy ears (USDA standard with ears greater than 15 cm) were obtained from high cowpea mulch rates (4.4 to 6.6 kg m^{-2}) ($P<0.05$). Total number of ears and total ear weight corresponded to a third-order polynomial ($R^2 > 0.90$) peaking at 6.6 kg cowpea mulch m^{-2}.

8:45 a.m. AGR-4 Bahia grass performance between tree rows of Loblolly pine (*Pinus taeda* L). L.A. WHILBY and O.U. ONOKPISE. Forestry and Natural Resources Conservation, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307. There is a need for scientific documentation of the interactive effects between trees and grasses for their production under agroforestry systems. Shade tolerant grasses are likely to maintain higher understory productivity levels under increasing levels of canopy closure. Studies comparing the trends of productivity of bahia grass, an important forage species in Florida, when grown in association with established loblolly pines are lacking or generally unknown. This research was done to determine herbage quantity and quality of two varieties of bahia grass, Tifton 9 and Pensacola, when grown between tree rows of thinned loblolly pine. Forage quantity was determined by harvesting regrowth using a quadrant (1 m x 1 m), whenever bahia grass plants attained 2.36 cm of height while forage quality was determined by analyzing for crude protein in the herbage. Preliminary data revealed that Tifton 9 had a much better stand than Pensacola variety during the summer and fall of 2003. Forage mass ranged from 0.86 g/m^2 to 22.54 g/m^2 for both varieties. Varietal selection will be needed for producing pastorable pastures in Agroforestry systems.

9:00 a.m. AGR-5 Impact of crop management history and fertilization on Sweet corn (*Zea mays* L.) yield. K.A. SEAMAN, R.N. GALLAHER, R. McSORLEY, and K.-H. WANG. Univ. of Florida, Gainesville, FL 32611. Nationwide, Florida ranks the highest in state gross receipts (over $100 million annually) for fresh-market sweet corn (*Zea* *mays* L.). Main effects, in a split-plot experiment, were three cropping histories, each beginning in fall of 2002 with sweet corn (history one), cowpea (*Vigna unguiculata* L.) (history two), and sunn hemp (*Crotolaria juncea* L.) (history three), respectively, and each history continuing with Austrian winter pea (*Pisum sativum* subsp. *arvense*) as a winter cover crop followed by sweet corn in the spring. Sub effects were three N sources. Sub-sub effects were five N rates (0, 50, 100, 150, and 200 kg ha^{-1}). Sweet corn yield was not affected by cropping history. Fancy ear yield (g m^{-2}) was related to ammonium nitrate rate (kg N ha^{-1}) by the 2nd order polynomial $y = 257 + 5.69x - 0.01x^2$, with $R^2 = 0.97$ ($p \leq 0.05$), which peaked at 770 g m^{-2} and 200 kg N ha^{-1}.

9:15 a.m. BREAK

9:30 a.m. AGR-6 Time domain reflectometry (TDR) based irrigation control system for nurseries in Florida. C. CORNEJO. Department of Agricultural and Biological Engineering, Univ. of Florida, Gainesville, FL 32611. Agriculture accounted for the largest use of freshwater in Florida in 1990 when agricultural water withdrawals totaled 3,805 million gallons per day. Water conservation is required to increase water management efficiency in agriculture, and to reduce potential negative environmental impacts. Moisture sensors and irrigation controllers are needed to improve irrigation management. The TDR moisture sensors were use to measure volumetric water content in Metro-500 growing media, used by the nursery industry. Different soil moisture values and duration of irrigation events were tested; water applied and drained was measured to determine the most efficient system. Also, TDR sensors were calibrated using soil moisture values calculated by weight differences. The water use was reduced from 180 cm^3 (Timer controlled system) to 70 cm^3 (TDR controlled system.) for *Spathiphyllum* planted in three-gallon containers per irrigation event.

9:45 a.m. AGR-7 Eastern Cottonwood (*Populus deltoides* Bartr. Ex marsh, var. *deltoides*) clonal performance in the greenhouse as woody biomass for phytoremediation of heavy metals. O.U. ONOKPISE (1), D. ROCKWOOD (2), and J. WALLACE (1). (1) Forestry and Natural Resources Conservation, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307, (2) School of Forest Resource Conservation, University of Florida, Gainesville, FL 32611. In February 2004, cuttings (ramets) were obtained from 50 cottonwood clones harvested at the North Florida Research and Education Center (NFREC), Quincy, Florida. These ramets were planted in 1 gallon (3.8 liters) greenhouse pots for a replicated root development study. An average of 4 ramets per replication for each clone was planted. The potting mix for this study was coconut fiber, perlite, and peat moss in a 1:1:1 ratio by weight. A granulated slow release fertilizer (Osmocote) – 15 N : 10 P : 10 K was applied to pots four weeks after planting. Survival rates (number of ramets sprouting) for each clone were determined at 6 and 8 weeks after planting (WAP). Plant growth as measured by tree height was determined at 8 WAP. Other observations included leaf discoloration, vigor of growth, and presence or absence of pests on leaves of the new sprouts. Plant tissue was analyzed for the composition of heavy metals in the leaves at 8 WAP. Only three (90-7, 109-7 and 11080-7) out of the 50 clones had 100 % survival rates, while the overall survival rate was 35 %. Average tree height was 12.67 cm (with a range of 4.72 cm to 18.35 cm) at 8 WAP. Results of tissue analysis revealed significant clonal variation for some of the heavy metals such as copper.

10:00 a.m. AGR-8 Enhancement of Barn owl populations in the Everglades Agricultural Area of South Florida for sustainable rodent control. J. MARTIN and R. RAID. Univ. of Florida, Everglades Research and Education Center, Belle Glade, FL 33430. Small rodents, primarily in the form of rats and mice, cause an estimated $30 million in damage annually to sugarcane and vegetable crops in south Florida. Traditionally, growers relied on chemical rodenticides in an attempt to manage rodent populations. However, rodenticides are costly, short-lived, and may be of concern environmentally. The common barn owl, *Tyto alba*, is endemic to Florida but populations remain far below optimum due to a perceived shortage of natural nesting sites. With a single pair of nesting barn owls capable of eliminating in excess of 1,000 rodents per year, sugarcane and vegetable growers are interested in enhancing their populations to serve as a means of biological rodent control. Research has demonstrated that barn owls take readily to man-made nesting boxes placed along ditch banks and canals throughout the Everglades Agricultural Area. Prey diversity, box colonization, clutch sizes, and fledging success rates are being monitored to measure the success of the program.

10:15 a.m. AGR-9 Fecal microbial indicators in groundwater. M. MONTIEL (1), A. DHOPLE (2), and T. BELANGER (1). (1) Department of Marine and Environmental Systems. (2) Department of Biological Sciences. Florida Tech, Melbourne, FL, 32901. A total of 296 samples of groundwater were collected at five residential sites adjacent to Crane Creek, Melbourne, FL. Three of these sites were at homes served by on-site disposable systems (OSDS). The samples were analyzed for fecal indicator bacteria and coliphages. Fecal coliforms (FC) were present in 20.6% of the samples, and enterococcus (ENT) in 41.6%. Coliphages were detected in more than 90% of the samples. At two of the OSDS sites, FC frequency was twice as high as control sites, where FC was only found in a piezometer nearest to the surface water. The highest ENT frequency was found at one of the OSDS sites. Coliphage frequency was high at all sites, with values of more than 85%. Groundwater samples showed fecal contamination and OSDS may be one of the sources.

10:30 a.m. AGR-10 Eutrophication: legacy of, or legitimacy for agricultural prosperity. H.K. PANT (1), M.B. ADJEI (1), and J.E. RECHCIGL (2). (1) Univ. of Florida, Range Cattle Research and Education Center, Ona, FL 33865, (2) Univ. of Florida, Gulf Coast Research and Education Center, Bradenton, FL 34203. Apart from seed quality, sufficient nutrient supply is critical for increased agricultural productivity. Repeated cultivation on arable land requires replenishment of removed/lost nutrients, which is achieved by the application of fertilizers either in organic or inorganic forms. Soil fertility of the world's limited arable land is constantly decreasing, even as pristine water bodies are becoming increasingly eutrophic and degraded. For example, Lake Okeechobee (area 1730 km^2; an average depth 2.7 m) received excessive external phosphorus (P) load in the past mainly from the surrounding agricultural parcels. The excessive P has ultimately accumulated in mud sediments (in the center of the lake), and can now act as a net source for P depending on its concentration in the water column; nullifying efforts to reduce external P inputs. Although nutrient enrichment in lakes and rivers are sometimes considered as the legacy of economic development together with agricultural prosperity, perhaps, there may be some truth to that. However, seeking legitimacy for irresponsible activities toward degradation of one of the world's rare resources, freshwater, would not do any good to anyone, at least in the long-term parity. Does this mean we need to overhaul our agricultural practices to protect freshwater??

10:45 a.m. AGR-11 Peanut yield and disease incidence affected by tillage and variety. R.N. GALLAHER (1), J.L. MCKINNEY (1), J.L. BALDWIN (2), and B. KEMERATE (2). (1) Univ. of Florida, Gainesville, 32611 and (2) Univ. of Georgia, Tifton, GA 31793. Proper tillage management and variety selection for peanut (*Arachis hypogaea* L.) is important for profitable farming. Strip-till was compared to conventional tillage management to test 12 peanut varieties following a winter crop of rye (*Secale cereale* L.). Tillage was the main treatment and variety was the sub treatment in a split plot experimental design with six replications. Pod yield was not affected by tillage. Best varieties were 'DP-1', 'Andru II', and 'AP-3' with pod yields of 5850, 5620, and 5540 kg ha^{-1}. These yields were almost twice the Florida state average. These high yielding varieties also had the lowest incidence of Tomato Spotted Wilt virus and Late Leaf Spot diseases. Disease ratings were lowest in strip-till treatment.

11:00 a.m. AGR-12 Mulch effects on growth and yield parameters of Scotch Bonnet hot pepper. G. QUEELEY, and C. GARDNER. Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307. Field studies were conducted on a Lakeland Sandy Loam soil in north Florida, during the 1999, 2000 and 2003 growing seasons to evaluate the effect of bahia grass (*Paspalum notatum* L) mulch, black plastic mulch and a control (bare soil) on growth and yield parameters of the Scotch Bonnet hot pepper (*Capsicum chinense* L). The experimental design was a Randomized Complete Block with 4 replications. Data on fruit size, fruits plant^{-1}, marketable fruits ha^{-1}, root and shoot development, above ground dry matter (DM) and plant tissue analysis were collected. For all 3 years of the study, there was a trend for the bahia grass mulch treatment to produce larger fruits, more fruits plant^{-1} and higher yield ha^{-1} compared to the control and black plastic mulch treatments. However, significant differences ($p < 0.01$) among these treatments for yield parameters were observed only in the final year of the study. There was no difference in root and shoot DM and root length between plants from the bahia grass treatment and the control. However, these parameters were significantly lower ($p < 0.01$) for plants grown on black plastic mulch compared to the control. The study indicates that compared to black plastic mulch, bahia grass mulch will contribute to better plant development and fruit yields in Scotch Bonnet hot pepper.

11:15 a.m. BUSINESS MEETING: AGRICULTURAL/NATURAL RESOURCES
MARTIN ADJEI, presiding

2:00 p.m. AGR-13 Tree growth of thinned Loblolly pines in Quincy, North Florida. O.U. ONOKPISE, and L.A. WHILBY. Forestry and Natural Resources Conservation, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307. As part of a Natural Resources Conservation Program, loblolly pine trees were planted on a farm in Quincy, North Florida, between 1981 and 1983. Trees had a spacing of 4 m x 4 m. From November 2001 to February 2002, trees were systematically thinned to a spacing of 4 m x 14 m in preparation for an agrosilvopastoral system. Tree diameter at breast height (DBH) was measured at 5, 10, 15 and 22 months after thinning (MAT), in order to determine tree growth and productivity under the spacing achieved. Diameter was determined by using a hand-held diameter calipers. Mean diameter for all trees was 2.55 m, 2.74 m, and 2.97 m at 5, 10 and 19 MAT respectively. The increased tree growth (up to 20 %) as represented by DBH, in just 19 MAT may be due to the wide spacing achieved from the thinning process, allowing for more light penetration and reduced competition for soil resources among the trees. Other observations included wind damage and the rate of decay of stumps following thinning with regards to sustainable agriculture.

2:15 p.m. AGR-14 Hairyawn muhly grass (*Muhlenbergia capillaries* L), a Florida native grass species evaluated for the biological control of Cogongrass (*Imperata cylindrica* L), an invasive species. O.U. ONOKPISE (1), H.V. DUEBERRY (1), and J. NORCINI (2). (1)Forestry and Natural Resources Conservation, Division of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307, (2) North Florida Research and Education Center (NFREC), IFAS, University of Florida, Quincy, FL 32351. Cogongrass *(Imperata cylindrica* L) introduced into the United States in the early 1900s as a possible forage crop and soil erosion control plant species is now ranked among the ten most invasive species in Florida. The utilization of herbicides like glyphosate and imazypr for its control, has proven to be ineffective and/or problematic for soil environmental health. Similarly, cultural practices like cultivation and burning have remained unsuccessful. Therefore, using a native grass species offers a sustainable management approach for controlling cogongrass. Hairyawn muhly grass, a Florida native grass species was evaluated for its effectiveness in out-competing and controlling the growth of cogongrass. Plantlets of muhly grass and cogongrass were planted in 1 gallon (3.8 liters) greenhouse pots containing a mixture of mushroom, peat and topsoil in 1:1:1 ratio by weight. The pots were arranged in three replications with treatments randomly assigned to each replication. Seventeen weeks after planting (WAP), root and shoot biomass, relative yield total (RYT) and relative crowding coefficients (RCC) were determined for muhly grass and cogongrass grown individually and in combination. Root, shoot and total biomass of cogongrass were reduced by 41 %, 23 % and 35 % respectively, when grown with muhly grass at 17 WAP. The RYT of cogongrass was 2.81 while RCC was 1.07 indicating that at 17 WAP muhly grass was effectively competitive with cogongrass. Additional studies will be needed to demonstrate the use of this Florida native grass species as a biological control agent for a major invasive species in Florida.

2:30 p.m. AGR-15 Competitiveness of four Basil (*Ocimum basilicum*) types with Yellow nutsedge (*Cyperus esculentus*). J.P. MORALES-PAYAN and W.M. STALL. Horticultural Science Department, Univ. of Florida, Gainesville, FL 32611-0690. Replacement series experiments were conducted in Gainesville, Florida, to determine the competitive ability of four types of basil (purple, sweet, lemon, and Italian basils) with the weed yellow nutsedge. Basil transplants (10-cm tall) and viable nutsedge tubers (0.2 g) were grown in plastic containers filled with sandy soil, in replacement series of 4:0, 2:2 and 0:4 basil:nutsedge plants per container. Basil and nutsedge shoot height, and fresh and dry weights were determined at harvest (60 days after transplanting). Relative yield analysis was used to determine competitive ability. Sweet and Italian basils were more competitive than yellow nutsedge, whereas purple and lemon basils were as competitive as yellow nutsedge. Purple and lemon basils were shorter and had less leaf area than Italian and sweet basils, which may help explain their difference in competitiveness with yellow nutsedge.

2:45 p.m. BREAK

3:00 p.m. AGR-16 Interference of pure and mixed populations of the weeds *Amaranthus dubius* and *Digitaria sanguinalis* with Sweet basil (*Ocimum basilicum*). J.P. MORALES-PAYAN and W.M. STALL. Horticultural Science Department, Univ. of Florida, Gainesville, FL 32611-0690. Weed management is an important component of sweet basil production. Mixed populations of *Amaranthus dubius* (AD) and *Digitaria sanguinalis* (DS) may emerge in basil soon after crop transplanting. The effect of AD and DS on basil yield is unknown, and information on said effect may be useful to device weed management strategies. Transplanted basil (6 plants.m^{-2}) was grown weed-free and competing with 4 weed plants.m-2 (AD:DS proportions of 0:4, 1:3, 2:2, 3:1, and 4:0) for six weeks. Basil yield loss was higher as the proportion of SD increased. Basil yield losses were 31 and 80% when competing with pure stands of AD and SD, respectively. When basil competed with the 3:1, 2:2, and 1:3 AD:SD mixed populations, yield losses were 50, 69, and 76%, respectively, as compared to weed-free basil. Thus, SD was more detrimental to basil yield than AD. Management strategies should aim at the suppression of both weeds, but when available means of weed suppression are expected to differentially affect AD and SD, growers may benefit more from SD suppression.

3:15 p.m. AGR-17 Effects of applied phosphorus (P), lime and gypsum on Stargrass forage yield and quality, and water quality. M.B. ADJEI (1), J.E. RECHCIGL (2), and I.S. ALCORDO (1). (1) Univ. of Florida, Range Cattle Research, Ona, FL 33865, (2) Univ. of Florida, Gulf Coast Research and Education Center, Bradenton, FL 34203. Phosphorus is the primary cause of eutrophication and algae blooms of lakes in south-central Florida and excessive P fertilization on pasture may contribute to the problem. Treatments for a field experiment conducted in the Lake Okeechobee Basin consisted of 0, 12.5, 25.0, and 50.0 kg P ha^{-1} yr^{-1} from triple super phosphate. Additionally, the soil amendments calcium carbonate ($CaCO_3$) and mined gypsum ($CaSO_4$) were applied at 0.2 and 4.0 Mg ha^{-1} yr^{-1} based on 100% $CaCO_3$ to other plots that received 50.0 kg P ha^{-1} yr^{-1}. Each P or P and soil amendment treatment was applied to 15.2 x 30.4 m plots on a stargrass (*Cynodon nlemfuensis* Vanderyst) pasture arranged in a RBC with four replicates. Stargrass forage yield, crude protein and digestibility were not impacted by P fertilizer for 3 yr. Although applied P improved tissue P concentration, most cattle producers routinely feed a balanced mineral mix. Applied P caused significant buildup of P in the Ap, E and Bh soil horizons, increased soluble P concentration in shallow and deep wells by 400% and 1500%, respectively, and in surface runoff by 50%. Gypsum was not beneficial in reducing P in surface runoff. Although Ca-lime amendment reduced total P in surface runoff, its long-term benefits are not clear due to equilibrium effects. This study collaborated results from other multi-county studies to provide strong support for the recent reduction in IFAS P fertilizer recommendation on improved grass pastures in south Florida from 40 to 20 kg P ha^{-1} yr^{-1} at no cost to forage production.

3:30 p.m. AGR-18 Watershed scale assessment of nitrogen and phosphorus loadings in the Indian River Lagoon Basin. G.C. SIGUA. United States Department of Agriculture, Agricultural Research Service, Subtropical Agricultural Research Station, Brooksville, FL 34601. Establishment of a watershed scale seagrass-based nutrient load assessment is the major aim of water quality management in the Indian River Lagoon (IRL). The development of such targets requires information on nutrient concentration, external nutrient loading rates, sediment nutrient flux estimates, and rate estimates of nutrient turnover (uptake and release) among the major plant communities in the IRL. There is growing evidence that the ecological and biological integrity of the lagoon has declined during the last 50 years, probably due to the decline in water quality. Best estimate loadings should incorporate watershed-scale wet and dry deposition, surface water, groundwater, sediment nutrient flux, and point source effluent discharge data. On the average, the IRL is receiving annual external loadings of 832,645 and 94,476 kg of total nitrogen (**TN**) and total phosphorus (**TP**), respectively from stormwater discharges and agricultural runoff. The average internal cycling of TN and TP from sediment deposits in the IRL was about 42,640 kg TN and 1,050 kg TP per year. Indirect evidence suggests that atmospheric deposition has played a role in the ongoing nutrient enrichment in the IRL. The estimated total atmospheric deposition of TN and TP was about 32,940 and 824 kg per year, while groundwater contribution was about 84,920 and 24,275 kg per year, respectively to the surface waters of the IRL. The estimated annual contribution of point effluent discharge was about 60,408 kg TN and 7,248 kg TP. In total, the IRL basin is receiving an annual loading of about 1,053,553 kg TN and 127,873 kg TP. With these results, it is clear that the current rate of nutrient loadings is causing a shift in the primary producers of the IRL from macrophyte to phytoplankton- or algal-based system. The goal is to reverse that shift, to attain and maintain a macrophyte-based estuarine system in the IRL.

3:45 p.m. AGR-19 Economic and ecologic assessment of groundwater nitrogen pollution from North Florida dairy farm systems: an interdisciplinary approach. V.E. CABRERA. School of Natural Resources and Environment. Univ. of Florida, Gainesville, FL 32611. The presence of nitrogen (N) in water is an environmental hazard because it affects human health and ecosystem welfare. The Suwannee River Basin in Florida has received much attention in recent years due to increased N levels in water bodies. Dairy waste is thought to be an important factor contributing to this water N pollution. Evidence indicates that farms may reduce their total N loads by changing some management strategies. Using published and stakeholders' information, a dynamic, empirical, stochastic, interactive, and user-friendly model was created to simulate north Florida dairy farms and use it to test management strategies that may reduce nitrogen pollution and still maintain farm profitability. Testing different crop rotations, crude protein contents, time spent on concrete by milking cows, and time of liquid manure in the storage pond, it was found that intensive crop rotations have the greatest impact on reducing N loss and at the same time improve profitability. It was also found that reducing crude protein in diet may reduce N release and increase profitability. Reduction in time spent on concrete reduces the amount of manure N handled by the system and consequently may reduce the amount of N lost to the environment. Increasing the time liquid manure spends in the storage pond may reduce the risk of N lost to groundwater but increases the amount of N lost to the air, which is not used by the crops and consequently decreasing profitability. A combination of decreasing crude protein content in the rations and efficient crop rotations may considerably increase profitability and decrease N loss to the minimum.

4:00 p.m. AGR-20 Trend analysis of specific conductance in farm canals in the Everglades Agricultural Area (EAA). M. CHEN, S.H. DAROUB, and T.A. LANG. Everglades Research and Education Center, Univ. of Florida, Belle Glade, FL 33430. Specific conductance was monitored as a water quality parameter at 12 discharge sites on 10 farms in the EAA during 1997-2003. Elevated mean specific conductance (>1.275 mS/cm) was found at 3 discharge sites, which might be a result of geological influences. Specific conductance was impacted by water management practices: rainfall and pumping generally increased, while irrigation decreased specific conductance of canal water near the EAA farms. Seasonal trend analysis confirmed that rainfall was associated with elevated specific conductance in August, September, and October. Non-parametric Mann-Kendall trend analyses indicated that downward trends were significant at several discharge sites (UF9202A, UF9205A, and UF9207B), as a result of implementation of farm level agricultural best management practices.

Agricultural and Natural Resources Poster

POS-1 Development of a method to measure total capacity of an irrigation system. C. CORNEJO. Dept. Ag. and Bio. Eng., U. Florida, Gainesville, FL 32611. The objective of this study was to determine the total area that can be irrigated under several scenarios of land use. The extent of the land that can be brought under irrigated production was estimated based on a simple water budget model that required estimation of crop water requirements, irrigation efficiency, and evaporation from the dams and canals based on the available weather data. CROPWAT, a software package developed by the United Nations Food and Agriculture Organization (FAO), was used for calculations of crop water requirements (CWR) and irrigation requirements. The reference evapotranspiration (ET_0) was calculated using historical average weather data for the Santa Elena Peninsula and the results were used to create average monthly surface maps of ET_0 using ArcMap® (ESRI®). Nine scenarios were created to calculate the water available for agricultural production and the area that can be irrigated with available water.

ANTHROPOLOGICAL SCIENCES

FRIDAY 8:00 a.m. – ENGINEERING BUILDING-2 103
LINDA TAYLOR, UNIVERSITY OF MIAMI, presiding

8:00 a.m. ANT-1 Nutritional fitness for healthy bone development in Amazonian Indian women of childbearing age. F. BERTI. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. I present an analysis of data collected on nutritional ecology by D. L. Dufour and S. Stinson for women living in Amazonia. Their data profiles dietary intake of females before, during, and after childbearing. Intake of proteins, minerals, and vitamins varied by seasonal availability of resources and cultural group. Nutrient intake, such as calcium, and exercise are essential for bone health, development, and maintenance of mass because malnutrition impairs skeletal development before any other body system. I found that during the rainy season females gather and eat specific plant foods that provide fat and protein. Overall, their nutritional fitness was affected by 1) availability of resources, 2) socially-defined food preferences, and 3) heavy weight bearing activity. Although there is no universal dietary standard to ensure healthy bones, my analysis supports the lack of nutritional fitness for these Amazonian women according to USDA guidelines.

8:15 a.m. ANT-2 Audubon House: recreation of historical representation from archaeological excavation. R. MORALES and M. FARALDO. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. The Audubon House of Key West (FL) was the family home of Captain John H. Geiger, harbor pilot and master wrecker. The was originally built by ships' carpenters in the early 19th century and furnished with salvaged goods from ships wrecked on the reef. It was maintained by the Geiger family and heirs for 120 years. During the 20th century the house was neglected and lost most of the original contents. In 1958, Key West native Col. Mitchell Wolfson and his wife purchased the property and created a foundation restore the home and preserve it as a public museum. Their Foundation seeks to recapture the original decorum, style, and cultural details. We present data from an archaeological excavation from May 2003. The items recovered represent the style of dishes, types of cookware, glassware, and various types of domestic goods circa 1870 to 1920.

8:30 a.m. ANT-3 Little Salt Spring (8SO18): an overview of 2002 field season. J.P. LOWRY and J. GIFFORD. University of Miami Dept. of Anthropology, P.O. 248106, Coral Gables, FL. 33124. Little Salt Spring, in southwest Florida, is an archeological site from which some of the oldest remains of human habitation in South Florida have been documented. Although the site has both terrestrial and aquatic components, most research on the site has been underwater archaeology, requiring SCUBA equipment. The spring's waters are anoxic which allows for some excellent preservation of organic material. In the 2002 field season, excavations began on two new portions of the site and continued on a third. We recovered numerous artifacts in assemblages. The assemblages are notable because previously such items had been found only as isolated, single artifacts. These artifacts show a possible range of tool types. I also present the history of the site and summaries of materials recovered to date. Support for this project was provided in part by The University of Miami.

8:45 a.m. ANT-4 Sex and the single skeleton: Resexing MMS-18/C. K. O'DONNELL and S. McNULTY. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. In 1978 the Miami Museum of Science imported a modern human skeleton for instructional purposes and identified it as a female. The skeleton, referred to as "Penelope", was loaned to the University of Miami's Department of Anthropology for use in its forensic osteology program. Our initial examination, measurement, and analysis suggested that it is a male, not a female. The pelvis is reliable for sex determination because key sex-specific characters can be seen in the pubis and ilium. We collected additional data from features of the femur, frontal, temporal, occipital, mandible, and sternum with those from the pelvis data to verify our initial assessment of MMS-018/C. Results of the data we analyzed were all representative of typically male skeletal traits. Therefore, "Penelope" is a male, and perhaps should be renamed "Peter."

9:00 a.m. BREAK

9:15 a.m. ANT-5 Origins: population affiliation of the Miami Museum of Science Skeleton MMS-018/C. R. DUNBAR. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. In 1978, the Miami Museum of Science imported a modern human skeleton initially identified as female. The skeleton is on loan to the University of Miami's Department of Anthropology. The surviving documentation did not specify origin or population affiliation. I examined the skeleton to identify traits often associated with forensic reconstructions designed to identify which population subset human skeletons may be assigned to. Such determinations are an important aspect of forensic identification of skeletal remains. I combined 1) non-metric cranial traits, such as facial profile and the shape of the nasal aperture, and 2) metric traits, such as the cranial index and post-cranial traits to determine population affiliation of MMS-018/C. My analysis supports the hypothesis that MMS-018/C is Asian in origin.

9:30 a.m. ANT-6 Faunal remains from *La Nuestra Senora de Atocha* and *Santa Margarita*. M. FARALDO and L.L. TAYLOR. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. We analyzed the faunal remains from two 17th Century Spanish galleons, to document diet, and perhaps lifestyles, aboard these vessels. We hypothesized that the fauna would be from the New World since the ships sank on the return voyage to Europe. We analyzed 311 bones and found: cattle (*B. taurus*, N=134), hogs (*S. scrofa*, N=82), horses (*E. caballus*, N=28), fowl (*G. gallus*, N=10; *M. gallopavo*, N=6), sea turtle (*C. mydas*, N=4), buffalo (*B. bison*, N=8), sheep/goats (*Ovis/Capra*, N=33), rats

(*R..rattus*, N=4), and deer (*O. virginianus*, N=2). Most remains were Old World fauna. The bones from cattle and hogs were butchered. Processing marks suggest each item was used to the fullest extent possible. The horses, buffalo, and deer were likely live cargo, as were the rats, because none of their bones show signs of butchery. Our data did not support the original hypothesis.

9:45 a.m. ANT-7 The "Cubanization" of Southern Florida: 150 years of change. M.R. FARALDO and M. FARALDO. Univ. of Miami, Dept. of Anthropology, P.O. Box 248106, Coral Gables, FL 33124. In 1871, Cuba was, as it is now, without personal freedom and democratic government. Spain ruled Cuba, running sugar mills, cigar factories, and imbuing Cuba's daily life with Spanish influences. Enslaved Africans became part of the labor force and the force of cultural change. Historically, some Cubans fled to Key West and Southern Florida seeking independence and freedom. By 1871, Key West's population had swelled by this influx to more than 5,650 from 2,913 in 1860. Today, exiles continue to arrive in Florida, where they constitute more than 60% of the state's population. We present data on political, faith, and family life variables, drawn from interviews and historical documents in the San Carlos Institute collection which illustrate the hybrid known as Cuban-American culture. This research was supported in part by Medley Law Center.

10:00 a.m. ANT-8 Object manipulation in a group of long-tailed macaques. S. GONZALEZ, S. EVANS, and C. HURLBURT. DuMond Conservancy, 14825 SW 216 street Miami, Fl. 33170. Object manipulation was observed in a group of approximately 100 semi-free-roaming long-tailed macaques (*Macaca fascicularis*) in a 2.8 hectare naturally forested area. Macaques were regularly observed to rub sticks and stones together and (less frequently) strike stones together. Over an observation period of 40 hours, 37 rubbing bouts and 3 striking bouts, lasting from several seconds to 30 minutes, were recorded. Both males and females over 6 months of age were observed to perform this behavior. This behavior may be an attempt to obtain minerals from the stone. These macaques are provisioned and while they spend much of their time foraging, they may not have access to all of the components of their natural diet. A stone manipulating behavior has been observed in wild Japanese macaques; however, it does not seem to be related to the stick and stone rubbing.

10:15 a.m. BREAK

10:30 a.m. ANT-9 Ancient antibiotics: tetracycline in bone from the Southwestern Egypt. C. MAGGIANO (1), T. DUPRAS (2), and J.

BIGGERSTAFF (3). (1) Dept. of Bio. and (2) Dept. of Soc. & Anth., Univ. of Central Florida, Orlando, FL 32816. (3) Ctr. Biomarker Anlys., Univ. of Tennessee, Knoxville, TN 37932. Tetracycline (TC) contamination of food products by *S. aureofaciens* has been found in Northern Africa. In addition to bactericidal effects, TC limits bone formation *in utero* and may hinder bone resorption. We analyzed Roman-Egyptian human and animal bone (2100 to 1600 BP) from the Dakhleh Oasis. Due to TC's natural fluorescence we were able to use Confocal Laser Scanning Microscopy (CLSM). Most samples show TC exposure and Kellis 1 and Kellis 2 cemeteries display differences in fluorecence. CLSM allows three-dimensional, high-resolution imaging, resulting in increased accuracy in our analysis. Further investigation could have implications beyond archaeological contexts due to multiple modern uses for TC therapy.

10:45 a.m. ANT-10 Development and implementation of primate conservation education programs. C.M. CHAMBERS and S. EVANS. DuMond Conservancy, 14805 SW 216th St, Miami, FL 33170. Most nonhuman primates live in tropical, developing countries and often compete with humans for resources. They may be hunted for food and forest habitats are being clear cut. Due to human impact, one in three primate species is endangered. Effective conservation efforts must include educating local communities about adjacent forest inhabitants. Programs targeting children are most important, because as adults they will decide the fate of these animals. Children also educate their parents, and other family and community members. We have created a conservation education kit containing posters, activity sheets, toys and board game for distribution to schools in habitat countries. We know that by helping local youth to understand the value and significance of their nonhuman primate neighbors, we help protect and preserve them and their habitats.

11:00 a.m. ANT-11 No place to go: displaced women and their children. E.K. ADAMS. Honors College and Dept. of Sociology and Anthro., U. of Central Florida, Orlando, FL 32816. Transitional living programs provide residence to persons under the premise that while they reside in such a facility, they will continuously be working in tandem with their case-manager and other service providers to once more become self-sufficient when leaving the program. I examine the actual functioning of one transitional living program in the Central Florida area – given the pseudonym the Women's Transitional Living Facility (WTLF), which serves only women and their children – investigating the positive and negative effects of the rules in place in this institution, and how they are applied by the staff of the WTLF. Research consisted of anthropological ethnographic fieldwork during 26 weeks in 2003, including participantobservation and semi-structured interviews, with people who serve, have served, or are residing within the Women's Transitional Living.

11:15 a.m. ANT-12 Community-controlled tourism in Peru: Taquile Island, 1968-2003. E.L. ZORN. Department of Sociology and Anthropology, Univ. of Central Florida, Orlando, FL 32816-1360. I analyze the exceptional case of Taquile, renowned "rustic" tourist destination. This permanent island is populated by 1,700 Quechua-speaking indigenous farmers, famous for their textiles. Taquile had unusual, rapid success with mass tourism, but also related problems, and challenges to community control. Taquile was an inward-focused community with few visitors in 1975, but was the region's primary tourist draw in 2000, attracting 40,000 yearly. Community control was due to serendipity, existing collective social organizations, and ability to finance infrastructure from textile sales. Taquileans lost control of tourism in the 1990s to regional and national tour agencies that challenged Taquile's transportation monopoly. Recent developments include conflicts from increased socioeconomic stratification, a decline in weaving, and new efforts to develop new tourism models.

11:30 a.m. ANT-13 Coca Growers and the State: Bolivia's Policy in Crisis. B.M. SMITH. Dept. of Sociology and Anthropology, Univ. of Central Florida, Orlando, FL 32816. Since the adoption of Law 1008 in 1988, Bolivia's government has organized a campaign to eradicate coca crops in an effort to reduce cocaine drug trafficking. Destruction of crops is usually carried out by the Bolivian military or special police forces with support from the United States. However, such actions sometimes result in egregious abuses of human rights including unwarranted search and seizure of property, torture, and death. I examine the importance of coca leaf to indigenous Andean cultures how coca eradication impacts their lives. The role of the military in Bolivia is discussed, which leads to the question of whether the Bolivian military should actually be involved in the drug war. Suggestions are made for reexamining the role of the military and the training of special police in order to reduce the incidents of human rights abuses against Bolivian peasant coca growers.

11:45 a.m. BUSINESS MEETING: ANTHROPOLOGICAL SCIENCES
LINDA TAYLOR, presiding

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES

FRIDAY 8:30 a.m. – ENGINEERING BUILDING-1 383
JOHN WINDSOR, FLORIDA INSTITUTE OF TECHNOLOGY, presiding

8:30 a.m. AOS-1 Estimating sediment accumulation rates in Crane Creek, FL, from total suspended solids and streamflow measurements. J.G. WINDSOR, M. CHANSON and D. STRACCIONE. Dept. of Marine and Environmental Systems, Florida Institute of Technology, 150 W. University Blvd, Melbourne, FL 32901. Crane Creek was dredged in 1998. The key question addressed here is how long will it be until Crane Creek will require dredging again. Based on mean discharge rates and mean TSS values at US 1, Babcock Street and Hickory Ditch, from 400 to 600 tons of total suspended matter are estimated to have been trapped within the Crane Creek system annually between 1998 and 2000. Storm impacts may raise those estimates by a factor of 2. Sedimentation rates based on these calculations alone (0.6 to 0.8 cm/yr) suggest that the Crane Creek will not have to be dredged again for more than fifty years.

8:45 a.m. AOS-2 Influence of seagrass density and substrate type on the propagation and growth of *Caulerpa prolifera*. R. RAVES and E. IRLANDI. DMES, Florida Tech., Melbourne, FL 32901. A mesocosm study was conducted to investigate the influence of *Halodule wrightii* density and substrate type (sand and organic-rich sand) on the survival and growth of *Caulerpa prolifera*. *H. wrightii* density did not significantly influence *C. prolifera* in this study. *C. prolifera* frond densities, fragment lengths and biomass exhibited a significant positive response to sand substrates with low organic matter (< 1% dry wt) and low sulfide concentrations (<35µM). Although *C. prolifera* growth was more favorable in less organic sediments, the results of this study also indicated that *C. prolifera* is capable of rapid expansion within more organic, finer-grained sediments, especially when compared to *H. wrightii*. Overall, *C. prolifera* frond density increased by 238% during the experimental period, compared to a 44% increase in *H. wrightii* shoot density during the same period.

9:00 a.m. AOS-3 Influence of hydrologic reconnection of a mangrove marsh impoundment on adjacent sediment and seagrass in the Indian River Lagoon, Florida. M. LE LAY, F. BREHIN, and E. IRLANDI. Dept. of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901. Four sites were sampled: two near culverts that provided hydrologic reconnection of the marsh to the lagoon, one midway between the two culverts, and a fourth south of the reconnected impoundment adjacent to a non-reconnected impoundment. Percent cover of seagrass and canopy height were lower at the culvert sites than at the other two sites. Amount of fine-grained sediments and sediment organic content were highest at the northern culvert as were pore water concentrations of ammonia, nitrate, and phosphate. While both sites adjacent to culverts appeared to be influenced by the reconnection, release of water to an embayment with restricted circulation at the northern culvert appeared to have a more negative effect on the adjacent sediments and seagrass.

9:15 a.m. AOS-4 Long term dune stability at the Barrier Island Ecosystem Center in Brevard County, Florida. G.D. DELFOSSE (1) and R. MOJICA (2). (1) Dept. Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901, (2) Brevard County Environmentally Endangered Lands (EELS) Program, Melbourne, FL 32940 The Brevard County EELs Program is currently developing the Barrier Island Ecosystem Center (BIEC) on a beachfront property within the Archie Carr National Wildlife Refuge. The dune system in front of the planned center was treated with the bio-dune dune stabilization system while vegetation became established. Prior to construction on BIEC, a detailed survey of the entire dune system was completed. A review of rectified aerial photographs from 1943 through the present indicated that the vegetated dune line has remained very consistent over the past 60 years. Recent topographic surveys conducted along the dune line in late 2003 are being used to guide the restoration of specific problem areas associated with human foot traffic.

9:30 a.m. AOS-5 The influence of temperature extremes on the growth, survival, and settlement time of the veliger larvae of *Mercenaria mercenaria*. C. FOSSANI, E. ELWAZZAN, H. JOBERT, and K.B. JOHNSON. Dept. of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901. We conducted experiments exposing veliger larvae of the clam *Mercenaria mercenaria* to temperature extremes, both constant and variable, to determine the effects on the key larval traits of growth rate, survivorship and time to settlement. Switching treatments will reveal whether early temperature history influences tolerance of later stages. Warmer temperatures may result in faster growth and development, but increased mortality at the greatest extremes. With regard to the switching treatments, one hypothesis being tested is that mortality in late larval stages increases when larvae are initially raised at opposite temperature extremes.

9:45 a.m. AOS-6 Can the Queen conch travel around its Caribbean kingdom? F. MORALES (1), E. IRLANDI (1), and D. CARROL (2). (1)

Dept. Marine and Environmental Systems, (2) Dept. of Biological Sciences, Florida Institute of Technology, Melbourne, FL, 32901. Connectivity of sub populations via larval dispersal is essential for the survival of many species. In the Caribbean, queen conch (*Strombus gigas*) is the most important mollusk. More than 200 adult tissue, or single larva samples of queen conch were collected from throughout the Caribbean. Partial 16S rRNA sequences from the samples were compared by PCR amplification, DNA sequencing, and multiple sequence alignment similarity searches. The data reflect a pattern of distribution suggesting that the main currents in the area, as well as other small oceanographic features, are strongly related to genetic flow, thus supporting the connectivity theory through larval drift for queen conch in the Caribbean, contrasting with previous results on fish larvae studies.

10:00 a.m. BREAK

10:15 a.m. AOS-7 Summer 2003: Indian River Lagoon environmental monitoring and observations of cysts of dinoflagellates. G.D. DELFOSSE (1), G.A. MAUL (1), and S.L. MORTON (2). (1) Dept. of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901, (2) NOAA/NOS, Charleston, SC 29412. During the summer of 2003, sixty-three Indian River Lagoon stations were sampled from Titusville to West Palm Beach. Observations from the IRL include DO, temperature, salinity, Secchi depth and Ule-scale color. Sediments were collected and shipped to the NOAA Hollings Marine Laboratory for the analysis of cysts of Pfiesteria-like organisms (PLOs). The IRL dissolved oxygen concentrations were between 8 and 10 mg/l (120 and 150% saturation). The temperature on average was 28-29°C, somewhat higher than normal. Salinity was higher than previous summers, averaging 29 psu. The Ule-scale values averaged around 7, which is typical of brown-green IRL waters. PLOs were identified at 16 of 63 stations.

10:30 a.m. AOS-8 Florida reef tract bottom temperatures: 1988-2001. A. MOULIN and G.A. MAUL (1) and H. HUDSON (2). (1) Dept. Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901, (2) NOAA, Marathon, FL 33050. Temperatures on coral reefs are seldom determined level of the corals themselves. On the Florida Reef Tract, thirty-three bottom temperature-measuring stations, at depths from 1 to 5 meters, have been providing in-situ values since 1988. These stations are distributed from Dry Tortugas to Biscayne Bay, mostly within the Florida Keys National Marine Sanctuary. Several points of interest were analyzed such as annual variation of temperatures and influence of the Florida Current and Florida Bay discharge. Although the records are less than 15 years long, no statistically significant temperature trends are observed. At a typical station, the variance about the annual mean is +/- 3.7°C. The annual cycle is clearly discernable, but episodic events such as Florida Current meandering and Florida Bay discharge are yet to be quantified.

10:45 a.m. AOS-9 The development and evaluation of an algorithm to map GOES-12 SSTs to near surface over-ocean air temperatures. C. CALVERT and S. LAZARUS. Dept. of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901. The primary sources of near surface air temperatures over oceans are obtained from buoy and ship weather reports. Unfortunately, there are few buoys and ships at any given time, making it difficult to produce adequate air temperature analyses over the ocean east of Florida. Here, we present initial results using data spanning a five-year period from 1998-2002 from two offshore NOAA weather buoys east of Cape Canaveral. We can estimate coefficients from a multilinear regression algorithm using various combinations of predictors (e.g., wind speed, SST, etc.) and GOES-12 SSTs. The goal is to apply the hourly GOES-12 SST analysis to produce an initial guess field of over-ocean air temperature which will be used for assimilation into the operational NWS Melbourne office mesoscale forecast model.

11:00 a.m. AOS-10 Evaluation of coastal Florida wind energy: A detailed examination of Kennedy Space Center tower data. J.L. BEWLEY and S.M. LAZARUS. Dept. of Marine and Environmental Systems. Florida Institute of Technology, Melbourne, FL 32901. This study is designed to quantify the available wind power at commercial turbine hub heights (295 ft, 394 ft, and 492 ft) from Kennedy Space Center (KSC) wind tower data. 7 years of data (1995-2001) from towers #3131 and #0511 in the KSC/Cape Canaveral Air Force Station wind tower network were used to produce monthly and diurnal statistics. At each level, 5-minute average wind speeds and directions for each month were analyzed and binned as a function of average wind speed, and as a function of direction to produce probability distribution functions. The 5-min. average wind speeds were also used to reproduce the monthly diurnal trends, as well as the diurnal trends for wind power. Preliminary (winter) results indicate average 492 ft. wind speeds (power) peak during the night with a mid morning minimum.

11:15 a.m. AOS-11 The assimilation of MODIS temperature and water vapor profiles into a mesoscale analysis system. B.T. ZAVODSKY (1), S.M. LAZARUS (1), P.F. BLOTTMAN (2), and D.W. SHARP (2). (1) Florida Institute of Technology, Melbourne, FL 32901, (2) NOAA, National Weather Service, Melbourne, FL 32901. The Florida peninsula is unique.

The domain the coupled ARPS model and its analysis component, the ARPS Data Analysis System (ADAS), are run is dominated by the surrounding water, but data is sparse in these regions. The off-shore analyses converge to the background field due to this lack of data. We present results for which ADAS is configured to ingest profiles from MODIS Atmospheric Profile Level 2 products, which provide data over the observation-starved ocean regions. We examine the spatial correlation characteristics of the satellite swaths, compare the retrieved profiles with the 20-km RUC background field, and evaluate the retrieved profiles by comparing with synchronous upper air data. Our work is supported by a NOAA/UCAR grant.

11:30 a.m. BUSINESS MEETING: ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES
JOHN WINDSOR, presiding

Atmosphere/Ocean Sciences Posters

POS-2 Cast-netting impacts on juvenile fish abundance and biodiversity in Canaveral National Seashore, Florida. H. PIPER and L. WALTERS. Dept. of Biology, Univ. of Central Florida, Orlando, FL 32816. Canaveral National Seashore resource managers are concerned that cast-netting for juvenile fish to use as bait is reducing species abundance and distribution. To test this hypothesis, 4 sites were selected. Each site consisted of 2 locations, one easily accessible to the public (boat ramps, docks, sandy shores) and one accessible only by wading south of the easy access location for 5 minutes. Cast-net samples were taken twice daily every 2 weeks for 12 weeks. Fish species and length, water salinity and time were recorded. Eight species of juvenile fish were caught throughout the Lagoon which indicated low biodiversity. No differences were found between easily accessible, popular cast-netting locations and less impacted sites. This suggests that, in Mosquito Lagoon, juvenile fish readily disperse and at present there are no long-term impacts of cast-netting.

BIOLOGICAL SCIENCES

FRIDAY 8:00 a.m. – ENGINEERING BUILDING-2 203
SESSION A - VERTEBRATES
DAVID KARLEN, ENVIRONMENTAL PROTECTION
COMMISSION OF HILLSBOROUGH COUNTY, presiding

8:00 a.m. BIO-1 Retinal development in elopomorph fishes. S.M. TAYLOR and M.S. GRACE. Dept. Biology, Florida Inst. Tech., Melbourne, FL 32901. Vision is critical to survival and development in fishes. Teleost fishes shift dramatically in ecology and morphology as they mature, and their visual systems must also change to maintain functionality. Unlike mammals, the teleost retina continuously adds new neurons, making it an important model system. We studied interspecific retinal development in the teleost subdivision Elopomorpha to test whether retinal architecture changes predictably as nearly identical elopomorph larvae mature to ecologically distinct adult forms. High resolution light microscopy revealed pure-rod retinas in all elopomorph larvae, in stark contrast to pure-cone retinas of most other teleosts. Juvenile and adult retinas were duplex, and photoreceptor arrays differed dramatically among species. The rare pattern of development found in elopomorph larvae is evolutionarily significant, while subsequent interspecific differences likely reflect ecological divergence. Support: Sigma-Xi GIAR to SMT.

8:15 a.m. BIO-2 Face suckers aren't sexy: effect of a parasitic isopod on mating success in male bicolor damselfish (*Stegastes partitus*). M.P. ROBINSON. Dept. Biol., Univ. Miami, Coral Gables, FL 33124-0421. Although parasites are known to be important in mate choice, most parasites are internal or cryptic. Choosers must assess parasite load indirectly by the vigor of the host. I examined the effect of a large, external isopod parasite, *Anilocra partiti*, on the mating success of the bicolor damselfish, *Stegastes partitus*, a fish with female choice and paternal egg care. I experimentally parasitized 20 adult damselfish males and observed them for five months. Mating success of parasitized males decreased to zero immediately. There was no initial difference in the courtship rates of experimental and control males, however. Some parasitized males mated successfully during the final two months of surveys. The presence alone of these parasites appears to be sufficient to affect female mate choice, thereby reducing the mating success of the male hosts.

8:30 AM BIO-3 Fluctuating asymmetry in Mosquitofish (*Gambusia affinis*) as a bioindicator of pollution. M. MCCULLAGH, E. PETRUCCELLI, and T.S. CAMPBELL. Dept. of Biology, Univ. of Tampa, 401 W. Kennedy Blvd., Tampa, FL 33606. Fluctuating asymmetry (FA) reflects differences between the right and left sides of a normally bilaterally symmetric trait and has been used as an indicator of developmental stability as influenced by environmental contaminants. We measured FA by counting the right and left pectoral fin rays of the mosquitofish (*Gambusia affinis*) collected from six different sites in the Tampa Bay vicinity: three presumably clean sites and three presumably polluted sites. We also collected data on basic water quality parameters from these sites. FA differed significantly between the clean and polluted sites, indicating that FA in mosquitofish is an effective bioindicator of water quality.

8:45 a.m. BIO-4 Possible use of seagrass blowouts as refugia by parrotfishes of different sizes. S. MACIÁ (1), M.P. ROBINSON (2). (1) Barry University, 11300 NE 2 Ave., Miami Shores, FL 33161, (2) Dept. of Biology, Univ. Miami, Coral Gables FL 33124. Seagrass beds provide food and shelter for many fish and invertebrate species. Blowouts are bare areas with an edge that is often steep-sided or forms an overhang. These areas increase habitat complexity within seagrass beds. We compared parrotfish grazing intensity at different distances from the edge of blowouts by counting and measuring the number of bite marks on seagrass blades. Grazing intensity, as measured by the % blades with bites and number of bites per blade, increased with increasing distance from the edge of the blowout. The size of the bite marks, which is indicative of the size of the fish that made them, differed with distance from the edge of the blowout, but with no consistent pattern. These data suggest that larger fishes feed in closer proximity to the shelter of the blowouts.

9:00 AM BIO-5 Evolution of the New World Coral snakes (*Micrurus* and *Micruroides*: Elapidae): phylogenetic evidence for taxonomic chaos. T.A. CASTOE (1), E.N. SMITH (2), and C.L. PARKINSON (1). (1) Dept. of Biology, Univ. of Central Florida, Orlando, FL 32816, (2) Dept. of Biology, Univ. of Texas at Arlington, Arlington, TX 76010. Coral snakes represent an extraordinary radiation of brightly colored venomous snakes including ~90 species. Despite the medical importance and wide distribution of coral snakes very little is known about their phylogeny. We present the most complete phylogenetic hypothesis for coral snakes to date, based on ~1.5kb of mtDNA sequence data for nearly 200 coral snake samples (OTUs). Our data suggest a majority of species are in need of critical review and that both the alpha taxonomy and generic recognitions are in conflict with phylogeny. Additionally, we discuss the possibility for multiple ancient invasions of the New World by Old World lineages of coral snakes, based on reconstructed mtDNA phylogenies and preliminary nuclear gene data.

9:15 a.m. BIO-6 Thermal contrast and infrared predatory targeting in copperheads. J.U. VAN DYKE and M.S. GRACE. Dept. Biol. Sci., Florida Inst. of Tech., Melbourne, FL 32901. Crotaline snakes image their environments using visible light via eyes and infrared (IR) radiation via pit organs. The IR system may operate on the basis of contrast (differential emission from thermally contrasting objects), but this hypothesis has never been tested. We investigated how thermal contrast influences IR imaging in the copperhead (*Agkistrodon contortrix*). Temporarily blinded copperheads in a temperature-controlled arena were presented with targets creating positive, negative, or zero thermal contrast differentials. Behavioral responses to positive and negative differentials were significantly greater than responses to zero differentials, and snakes preferentially targeted warm aspects of differentials. These results show that thermal contrast is the basis of IR imaging in pitvipers, and suggest that fundamental properties of IR imaging and vision are similar. JUV was supported by a Sigma Xi grant

9:30 a.m. BREAK

9:45 a.m. BIO-7 Sea turtle nutrient inputs to dune vegetation: a stable isotope analysis. L.B. PLOG, J.F. WEISHAMPEL, and J.D. ROTH. Dept. of Biology, UCF, Orlando, FL 32816. The east coast of Florida supports the world's third largest nesting population of *Caretta caretta* and the largest nesting population of *Chelonia mydas* in the continental US. To evaluate the contribution of nutrients from sea turtle eggs to dune vegetation, we measured stable-nitrogen isotope ratios ($^{15}N/^{14}N$) of turtle eggs and other marine sources and compared these to the ratios of four species of dune plants. We evaluated isotopic differences in the turtle eggs because ^{15}N generally becomes enriched at higher trophic levels. Isotopic signatures of vegetation were inversely proportional to the distance from shore and were compared between areas of low and high sea turtle nest density. The results demonstrate if sea turtle nesting is a biogeochemical link between marine and terrestrial environments. Assistance was received from the FL Federation of Garden Clubs, NMFS, Dr. L.M. Ehrhart and turtle crew.

10:00 a.m. BIO-8 Population demographic consequences of raccoon removals on sea turtle nesting beaches. B. BARTON and J.D. ROTH. Dept. Biology, Univ. Central Florida, Orlando, FL 32816. Raccoon predation is one of the highest causes of egg mortality for sea turtles. Predator removal is a common management tool to improve sea turtle nest success. Raccoons have been removed from Merritt Island National Wildlife Refuge since 1978, and the initiation of removals on Archie Carr NWR in 2003 allowed us to compare characteristics of a historically managed and an unmanaged population. We compared diet and demography of raccoons removed from these beaches. Differences in sex ratio, morphometrics, and diet of the two populations indicated that the management efforts are impacting the population structure. As raccoons can be important predators and seed dispersers for many species, these changes may imply more widespread ecosystem-level effects of predator removals. However, such effects have yet to be documented.

10:15 a.m. BIO-9 Evolution of the African ground squirrel genus *Xerus*: Phylogenetic and phylogeographic patterns reflect the influence of climate change. M.D. HERRON, J.M. WATERMAN and C.L. PARKINSON. Dept. of Biology, Univ. of Central Florida, Orlando, FL 32816. We used Bayesian and maximum parsimony phylogenetic methods and nested clade analysis to infer relationships among African ground squirrels (*Xerus*) using mitochondrial cytochrome *b* sequences. We inferred relationships among the four species of *Xerus*, evaluated the specific distinctness of Cape (*X. inauris*) and mountain (*X. princeps*) ground squirrels, and tested hypotheses for historical patterns of gene flow within *X. inauris*. The inferred phylogeny supports the existence of an "arid corridor" from the Horn of Africa to the Cape region until at least the Early Pleistocene. Our analyses suggest that *X. inauris* and *X. princeps* represent distinct monophyletic lineages, and thus appear to be valid taxa. Phylogenetic and phylogeographic patterns suggest distinct effects of climate change on population differentiation and speciation within *Xerus*.

10:30 a.m. BIO-10 Evidence of spontaneous ovulation in the Cape ground squirrel, *Xerus inauris*. L.M. BOUCHIE (1), J.M. WATERMAN (1), N.C. BENNETT (2) and T. JACKSON (2). (1) Univ. of Central Florida, Orlando, FL 32816, (2) Univ. of Pretoria, Hatfield 0028, South Africa. Whether ovulation is spontaneous or induced can have important implications for the evolution of reproductive strategies and social systems of a species. The Cape ground squirrel, *Xerus inauris,* is a highly social, non-hibernating ground squirrel found in southern Africa. To determine the method of ovulation in this species, ten males and 15 females were brought into captivity for a period of 15 weeks. Female urine was collected under different conditions and subsequently analyzed for progesterone content using RIA. The ovaries of six females were examined for follicular development. Hormonal and histological evidence suggests that the Cape ground squirrel is a spontaneous ovulator. This is the first evidence of spontaneous ovulation in a ground-dwelling squirrel.

10:45 a.m. BIO-11 Predation, habitat structure and evolution of sociality in ground-dwelling sciurids (Tribe Marmotini): a comparative analysis. B.A. PETTITT and J.M. WATERMAN. Dept. of Biology, Univ. of Central Florida, Orlando, FL 32816. Ground-dwelling sciurids have diverse social structures, inhabit varied environments and are an excellent group to examine social evolution. A correlation may exist between habitat structure, perceived predation risk and degree of sociality. Species with a high level of social structure tend to be found in open habitats with little protective cover. To test this hypothesis, data from the available literature was used to carry out a comparative analysis. Degree of sociality and habitat structure were mapped onto a maximum parsimony tree to ascertain any correlation between these two characteristics. Each possible case of inferred independent evolution of sociality corresponds with species found in open habitats supporting the hypothesis that habitat structure and predation pressure drive the evolution of sociality in ground-dwelling sciurids

11:00 a.m. BIO-12 Effects of vehicle approaches on polar bear behavior in Churchill, Manitoba. G. ECKHARDT, J.M. WATERMAN, and J. ROTH. Dept. of Biol., Univ. of Central Florida, Orlando, FL 32816. Polar bears near Churchill, Manitoba, aggregate along the coast of Hudson Bay in the fall waiting for the sea ice to form. These congregations of polar bears have led to a thriving tourism industry, with up to 10,000 people arriving in the fall to view bears on the tundra. Any potential disturbance of these bears, which have been fasting for up to 4 months, could be energetically costly to individual bears. Habituation to humans could pose a threat to bears and people in areas populated by both. We investigated the effect of tourist vehicles on polar bear behavior by recording responses of bears to approaching vehicles. Approach angle and increased exposure to vehicles affected the probability of response and the distance at which the response occurred. These data suggest that responses of individuals may be minimized by careful vehicle positioning for angle and distance to bears.

11:15 a.m.. BIO-13 The importance of caves as bat roosts on islands in the Bocas del Toro Archipelago, Panama. M.E. THOMAS. Dept. of Biology, Palm Beach Atlantic Univ., West Palm Beach, FL 33416. The Bocas del Toro Archipelago is a chain of small Caribbean islands off the northwestern coast of Panama. Unlike the volcanic islands of the West Indies, these islands were separated from the mainland due to a rise in sea level over the past 10,000 years. As speciation appears to be occurring on the islands in a number of vertebrate groups, including bats, the archipelago is of considerable biological interest, a veritable "*Galapagos of the Caribbean.*" Many of the island bats use limestone caves as day roosts. Data on the diversity, abundance, and roosting preferences of these bats are presented. The importance of the caves as bat roosts is discussed in light of the habitat loss and disruption occurring on the islands due to increasing development and tourism. Conservation strategies are proposed.

11:30 a.m. BUSINESS MEETING, BIOLOGY
CRAIG DUXBURY, WALT DISNEY IMAGINEERING AND DAVID KARLEN, ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY, presiding

FRIDAY 9:00 a.m. – ENGINEERING BUILDING-2 205
SESSION B – BOTANY & FIRE ECOLOGY
CRAIG DUXBURY, WALT DISNEY IMAGINEERING, presiding

9:00 a.m. BIO-14 Physiological ecology of drift algae in the Indian River Lagoon, FL. J.L. LISS (1), L.J. WALTERS (1), and K.S. BEACH (2). (1) Univ. of Central Florida, Dept. of Biology, Orlando 32816, (2) Univ. of Tampa, Dept. of Biology, Tampa 33606. Past research has shown that unattached algae are an extremely variable component of the Indian River Lagoon. Movement and abundance of drift is highly dependent on flow rates, light availability and nutrient levels. While the ecology of drift has been addressed, its physiology has not. We ask: Is there a difference in photosynthetic performance in drift versus attached algae? Manipulative field and laboratory experiments were conducted with the green macroalga *Codium decorticatum* using a Diving Pulse-Amplitude Modulated (D-PAM) fluorometer. Dark-acclimated rapid light curves were obtained; changes in alpha and ETR_{max} were used as indications of acclimation from an attached to a drift state. Our results show no significant physiological change; therefore we find no difference in photosynthetic performance between drift and attached algae.

9:15 a.m. BIO-15 Evaluation of attached algal films for removing phosphorus from agricultural runoff. M. KHARBANDA, S. JACKSON and T. DEBUSK. DB Environmental, Inc., 365 Gus Hipp Blvd., Rockledge, FL 32955. We performed a mesocosm assessment to quantify the ability of attached algal films (AF) to remove phosphorus (P) from agricultural runoff. The periphytic algae were cultured in long (22 m), shallow (2 cm) raceways at a hydraulic loading rate of 43 cm/day, which provided a short (1.1 hour) hydraulic retention time. During the 10-month study, these highly loaded AF systems reduced total P concentrations from an average of 83 to 45µug/L. Algal productivity and tissue P levels declined with distance from the raceway inflow. These data demonstrate that algal films can grow rapidly and effectively reduce aqueous P concentrations, even when cultured under a short HRT at relatively low inflow P concentrations.

9:30 a.m. BIO-16 Comparison of the phosphorus removal performance of native and exotic submerged macrophytes. T. AUTER (1), M. SEES (2) and F. DIERBERG (1). (1) DB Environmental, Inc., 365 Gus Hipp Blvd. Rockledge, FL 32955, (2) City of Orlando Public Works Dept., Orlando, FL. We performed a mesocosm study to assess the comparative phosphorus (P) removal performance of two native (*Najas guadalupensis* and *Ceratophyllum demersum*) and one exotic (*Hydrilla verticillata*) submerged macrophyte. The macrophyte culture systems were fed tertiary-treated domestic effluent at a hydraulic loading rate of 8.6 cm/day. Over a 10 month period, average inflow total P concentrations of 95 µg/L were reduced to 30, 34 and 43 µg/L by *Najas*, *Ceratophyllum* and *Hydrilla*, respectively. Outflow soluble reactive P (SRP) concentrations from the *Hydrilla* mesocosms averaged 20 µg/L, whereas outflow SRP levels from the mecososms containing native species were below 5 µg/L. Reasons for the poorer P removal performance by *Hydrilla* are unknown, but may be related to differences in physiology or plant habit.

9:45 a.m. BIO-17 Nutrient responses to multiple stressors in experimental agricultural wetlands. W.R. WHITE (1) and S.T. THRELKELD (2). (1) Howard T. Odum Center for Wetlands, University of Florida, PO Box 116350, Gainesville, FL 32611-6350, (2) Department of Biology, University of Mississippi, University, MS 38677. A 2^{7-1} center point enhanced fractional factorial design was applied to 72 wetland mesocosms to examine 7 main effects and 21 two-way interaction effects. Treatments included MSMA, chlorpyrifos, atrazine, inorganic nutrients (N, P, and Si), fathead minnow, kaolinite, and UV radiation. Dissolved, suspended, and periphyton C, N, and P, along with C:P, C:N, and N:P were measured. Only dissolved nutrient responses were significant, and all involved dissolved P. Of the 28 effects, the majority were easily explained as responses to changes related to nutrient addition and changes in ratios that included P (e.g., N:P, C:P). Thus, nutrient ratios do not appear to be consistent indicators of exposure to multiple stressors found in agricultural wetlands.

10:00 a.m. BREAK

10:15 a.m. BIO-18 Spatial phytoplankton composition and distribution of particles along the flow path within a large South Florida treatment wetland. J. POTTS, F. DIERBERG, and S. JACKSON. DB Environmental, Inc., 365 Gus Hipp Blvd Rockledge, FL 32955. Total suspended solids (TSS), chlorophyll *a* (Chl *a*), and phytoplankton cell concentrations within the seston were measured along a flow gradient within a 2602 ha constructed surface flow wetland. Changes in phytoplankton abundance, composition, and diversity occurred within the wetland. The Shannon-Weiner Index (H') indicated phytoplankton diversity was relatively low throughout the wetland (H'= 0.79-1.19). Chl *a*:TSS indicated that a higher percentage of the outflow particles consisted of phytoplankton cells. Total seston concentration was reduced at the outflow (1.3-3.3 mg/L) compared to the inflow (5.4-19.6 mg/L). It appears that treatment wetlands can preferentially remove large quantities of inorganic particles and phytoplankton, thereby making them efficient traps for reducing incoming particulate loads.

10:30 a.m. BIO-19 Post-fire structural and functional dynamics of soil microbial communities in Florida scrub. M.V. ALBARRACIN. Dept. of Biology, Univ. of Central Florida, 4000 Central Florida Blvd. Orlando, FL. 32826. Florida scrub is a fire-dependent ecosystem. The regeneration of species and recovery of ecosystem function is adapted to periodic destruction by fire. Fire effects on soil microbial community succession, including structure and metabolic/ecological function were analyzed. Soil and litter samples were collected from transects with 11 years, 3 year and 6 months fire suppression time periods. The 11 year transect was burned during the winter season, biweekly sampling was done until 6 months after fire. The microbial community showed significant differences in number of cells, metabolic activity , and community physiological dilution/extinction coefficient. Changes in structural composition and function related to time after fire, were associated to niche-specialization/substrate-specialization dynamics

10:45 a.m. BIO-20 Survival, growth and recruitment of longleaf pine (*Pinus palustris*) in burned and unburned forests. A. DELONG, C. LYON, D. FRISH and I.J. STOUT. Department of Biology, University of Central Florida, Orlando, FL 32816. A 3,344 m^2 long belt transect was established in a section of a longleaf pine forest located on the UCF campus in 1990. All longleaf pines with a dbh $\geq$ 2.54cm were individually tagged during the study period, with the exception of 2003. During 1995, a wildfire burned through a portion of the transect. Post fire, longleaf pines were monitored in 1997, 1998, 2000, 2002, and 2003. Comparisons of survival, growth and recruitment of adult pines were made between burned and unburned sites. Results from Kaplan-Meier and log-rank analyses indicate that pines in burned sections experience reduced survival ($p<0.001$). One-way ANOVA analyses reveal no significant differences between burned and unburned sections in growth ($p=0.447$) or recruitment ($p=0.302$). Our results for recruitment and growth are contrary to those of previous investigations. We suggest that the extreme drought of 1997 and 1998 experienced throughout Florida may have caused additive stress to the trees in the burned section, thereby affecting our results and hindering survival, growth, and recruitment of longleaf pines in the study area. We also suggest that further research be conducted to determine the dynamics of longleaf pine forests after fire, with concentration on the large mortality of adult pines.

11:00 a.m. BIO 21 *Clitoria fragrans* response to fire. S.R. KANE., D. FRISH, and I.J. STOUT. Dept. of Biology, Univ. of Central Florida, P.O. Box 162368, Orlando, FL 32816. *Clitoria fragrans*, a Federal- and State-listed plant species, was studied over 2 years in Polk and Highlands Counties on the Avon Park Air Force Range near Avon Park, Florida. Tagged individuals (n = 111) were monitored weekly on 7 transects, 4 of which were burned. Growth (stem length) and reproduction were compared between burned and unburned transects and between transects burned in February vs. July. Plants burned in February and in July flowered and produced seed in the same year. Long unburned plants generally failed to produce seeds.

11:15 a.m. BIO-22 Is the response of the old-field mouse (*Peromyscus polionotus rhoadsi*) to a prescribed burn positive, negative or neutral? A. SUAZO (1,2) and A. DELONG (2). (1) Department of Environmental Protection, 1800 Wekiwa Circle, Apopka, FL 32712, (2) Department of Biological Sciences, University of Central Florida, Orlando, FL 32816. Prescribed burning is a tool used by land managers to maintain healthy ecosystems. Floral response to prescribed fires is well known for communities that are regularly burned. However, faunal response to prescribed fires is variable and poorly researched. We documented the population dynamics of the old-field mouse (*Peromyscus polionotus rhoadsi*) after a prescribed fire in old fields at Lake Louisa State Park, Lake County, Florida. Populations of old-field mice were live trapped for one year in burned and unburned sections. The number of individuals trapped in burned grids was not significantly different from the number of individuals trapped in control grids (Mann-Whitney, p=0.921). Moreover, we tested the hypothesis that burned grids act as population sinks. However, the number of recruits (ANOVA, p=0.279) and the persistence time of individuals (ANOVA, p=0.969) in burned versus control grids was not different. Our results indicate that burned grids do not act as sinks. In addition, a population on one of our control grids crashed 30 weeks post-fire and has not yet recovered.

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-2 205
SESSION C - INVERTEBRATES
CRAIG DUXBURY, WALT DISNEY IMAGINEERING AND DAVID KARLEN, ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY, presiding

2:00 p.m. BIO-23 Spionid polychaetes as environmental indicators: an analysis of Tampa Bay monitoring data. D.J. KARLEN, T.L. DIX, S.A. GRABE, B.K. GOETTING, C.M. HOLDEN, and S.E. MARKHAM. Environmental Protection Commission of Hillsborough County, Tampa, FL 33605. The polychaete family spionidae is one of the most ubiquitous taxa in estuaries, occupying a diverse range of habitats and are considered good indicators of stressed environments. The Environmental Protection Commission of Hillsborough County, under the auspices of the Tampa Bay Estuary Program, has been collecting samples throughout Tampa Bay and its tributaries since 1993. Samples were collected annually from August to mid-October. Over 1,500 samples were collected between 1993-2001 and analyzed for benthic species composition. A total of 31 species of spionids were identified, with the six most abundant taxa accounting for 90% of the cumulative abundance for this family. These taxa included: *Carazziella hobsonae* (25.9%), *Prionospio perkinsi* (23.1%), *Paraprionospio pinnata* (14.9%), *Streblospio gynobranchiata* (14.6%), *Prionospio heterobranchia* (6.7%) and *Spio pettiboneae* (4.0%). *Prionospio perkinsi* and *Paraprionospio pinnata* were dominant throughout Tampa Bay, while *Streblospio gynobranchiata* dominated in lower salinity habitats. The other abundant taxa were dominant in different segments of Tampa Bay. Species distributions were influenced by depth, salinity, dissolved oxygen and percent silt/clay. Spionids in Tampa Bay apparently have some utility in characterizing environmental habitats as well as detecting changes in disturbance or recovery of degraded habitats.

2:15 p.m. BIO-24 Recruitment and restoration for the oyster *Crassostrea virginica* on intertidal reefs in areas with intense boating activity. L. WALL (1), L. WALTERS (1), P. SACKS (2), and L. HOFFMAN (3). (1) Dept. Biology Univ. of Central FL, Orlando, Florida 32816, (2) Deltona High School, Science Dept. Deltona, Florida 32725, (3) Dept. of Statistics, Univ. of Central FL, Orlando, Florida 32816. In Mosquito Lagoon intense boating activity occurs year-round and intertidal reefs of the eastern oyster, *C. virginica,* have declined in size and numbers over the past 50 years. Our goals were to: 1) determine if sediment churned up by passing boats has altered larval settlement, and 2) determine optimal restoration protocols for declining reefs. Experimental restoration began in May 2003 to develop ecologically and economically feasible restoration.

Recruitment increased through June, followed by a large, expected decline in recruitment and survival in July/August, due to competition, predation and/or extreme high temperatures. Currently, recruitment and survival continue successfully.

2:30 p.m. BIO-25 Preliminary life table data for *Artemia franciscana* in lab culture. K.A. SIEGEL (1) and J.R. MONTAGUE (2). (1) Department of Public Health, Florida International University, 1200 SW 8h St., Miami, FL 33199, (2) SNHS-Biology, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161. In order to examine the reaction of a marine environment to a known pollutant, one can reproduce conditions in the laboratory using brine shrimp bioassay. *Artemia franciscana*, the most common brine shrimp in North America, is the natural choice of completing such a study. However, a life table of brine shrimp must first be established before exposure to contaminants can begin. By recording eclusion of brine shrimp every 12 hours after adding 0.5 g of *Artemia franciscana* cysts to 354.5 ml of 35 ppt prepared salt solution and allowing to rest for 7 hours, it was found there is a steady increase in percent of hatchings with a peak at approximately 96 hours. A sharp decline in percent hatchings, with deaths, is noticeable after 120 hours. A life table for *Artemia franciscana* would help establish a frame of reference for time-sensitive studies in marine toxicology using bioassay.

2:45 p.m. BIO-26 Differences in morphology and ecology between Everglades (*Procambarus alleni)* and Slough crayfish (*Procambarus fallax)* in South Florida. P.G. VANARMAN. Dept. Biol. Palm Bch Atl. Univ., PO BOX 24708, West Palm Beach, FL 33416. Crayfish are important as ecosystem managers in wetlands of south Florida and the Everglades ecosystem. They serve as intermediates in food webs; as bio-indicators to assess effects of hydrology, fire, and nutrient enrichment; and as components in community sampling studies. The appearance of the epigean native Everglades (*Procambarus alleni)* and Slough crayfish *(P. fallax*) is similar, but distinct morphological and ecological differences exist. Biology and ecology of adults of both species were studied in the field, and juveniles were examined under laboratory conditions. Morphological differences were seen between these species in gonopods of first form males, ventricular annuli and ventral shields of mature females, pigmentation (headlights) at the base of the antennal glands, and sizes and maturity of three month olds. Differences in ecology were indicated by apparent preferences for different hydrological conditions, diurnal behavior patterns, and use of vegetation as shelter. Everglades crayfish are more often collected in shallower, temporary bodies of water, while Slough crayfish most often inhabit deeper, more permanent water conditions. The importance of these differences to ongoing Everglades restoration efforts is discussed.

3:00 p.m. BIO-27 Spectral shift in phototaxis through ontogeny of the caridean shrimp *Lysmata wurdmanni.* A. RHYNE (1), E. AURELLADO (1), T. HEERBRANDT (1), and K.B. JOHNSON (2). (1) Biology Department, Florida Institute of Technology, Melboourne, FL 32901, (2) Department of Marine and Environmental Systems, Florida Institute of Technology, Melbourne, FL 32901. We subjected larvae of the Peppermint shrimp *Lysmata wurdmanni* to a range of light spectra and intensities to examine their response to light. Larvae were less sensitive to light than some other decapods, typically requiring a light intensity of ≥ 10^{14} photons m^{-2} s^{-1} to elicit a response. *L. wurdmanni* showed a spectral shift from 480 to 520 nm through ontogeny, a new ontogenetic pattern of spectral preference. *L. wurdmanni* larvae are virtually unknown from field collections and phototactic patterns may suggest locations (i.e., expected depths and water quality) of naturally occurring larvae.

3:15 p.m. BREAK

3:30 p.m. BIO-28 Salinity tolerance of adult Hermit crabs, *Pagurus maclaughlinae*, in the Indian River Lagoon. S.E RHODES and R.L. TURNER. Dept. Biol. Sci., Fla. Inst. Technol., 150 W. University Blvd., Melbourne, FL 32901. *P. maclaughlinae* is the most common hermit crab in the Indian River Lagoon, except near inlets, where *Clibanarius vittatus* dominates. Wide seasonal variations in lagoonal salinity make it likely that *P. maclaughlinae* is euryhaline and that *C. vittatus* is restricted to inlets by its stenohalinity. This study focused on the salinity tolerance of adult *P. maclaughlinae* Shelled crabs were held without food individually at salinities of 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50‰ for up to 14 d ($n = 20$ per salinity). Controls were at ambient salinities of 17‰ (low-salinity control) and 20‰ (high-salinity control). Survivorship and molting were recorded daily (more often on Day 1). Crabs did not reach an LT50 after 14 d at test salinities of 15–35‰. None survived the first hour at 50‰. LT50 was reached by Day 2 at 45‰ and by Day 3 at 5‰ and 40‰. LT50 was reached by Day 13 at 10‰. No effect on molting was detected. While starved, *P. maclaughlinae* tolerates salinities above 10‰ and below 40‰, but the range probably depends on history of exposure in the field. Tolerance of its larvae is unknown.

3:45 p.m. BIO-29 Manipulation of the sea urchin *Diadema antillarum* in an attempt to reduce algae cover on coral reefs. A.M. NALEVANKO, S. MACIÁ and M.P. ROBINSON. Dept. of Biology, Barry University, Miami Shores, FL 33161. The black sea urchin, *Diadema antillarum* is an important algal grazer on many coral reefs. In Jamaica, coral reefs have been harmed both naturally and anthropogenically throughout the years and, as a result, *D. antillarum* populations have been reduced. When populations are low, algal cover increases and is detrimental to the overall health of the reef, as algae outcompete corals for light. *Diadema antillarum* were transferred from six donor (high abundance) sites to six similar recipient (low abundance) sites on the reef. Urchin test size and algae abundance were monitored for 6 weeks. Total algal biomass decreased on both donor and recipient sites, while little change was observed on control sites. Transferred urchins exhibited a strongly aggregated distribution. Urchin grazing greatly decreased algal biomass in the area immediately surrounding these aggregations.

4:00 p.m. BIO-30 The effects of Chromium-VI on the production of the sea urchin *Lytechinus variegates.* J. RHORA and J.M. LAWRENCE. University of South Florida, Tampa, FL 33620. Small amounts of chromium VI are carcinogenic in mammals. Concentrations of Cr in marine algae and seagrasses range from 0.06-7.17 μg/g dry weight and 0.1-30.6 μg/g dry weight respectively. To test for an effect of these concentrations, production (increase in organic material) was measured in *Lytechinus variegatus* from Sarasota fed prepared diets containing 0, 5, and 40μg Cr/ L and individuals from Ft. DeSoto fed diets containing 0, 50 and 100μg Cr/L. The urchins were fed for 4-5 weeks after which their gonads, gut, lantern and test with spines were weighed and ashed to calculate gonadal and gut indices and inorganic and organic percentage and content. After five weeks individuals in all treatments from Sarasota showed a significant increase ($P<0.001$) in the wet weight of the gut with no significant difference between treatments. There was also no significant difference in total production between treatments. Urchins in all treatments from Ft. DeSoto showed a significant decrease ($P=0.041$) in total organic material in the lantern, while all treatments had a significant increase ($P<0.001$) in total organic material in the gonads. There was no significant difference between treatments. Chromium in the feed at the concentrations used in this experiment does not affect the production of *Lytechinus variegatus.*

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-2 203
SESSION D – CELL BIOLOGY & PHYSIOLOGY
JEREMY MONTAGUE, BARRY UNIVERSITY, presiding

2:00 p.m. BIO-31 Genetic screen identifies genes that collaborate with nonmuscle myosin II and the RhoGTPase pathway to drive leg morphogenesis in Drosophila. J.S. CHANG SWAIN. SNHS-Biology, Barry University, 11300 NE 2nd Avenue, Miami Shores, FL 33161. The genetic combination *RhoGEF2*$^{1.1}$ *zip*^{Ebr}/*SM5* (hypomorphic allele of *zipper*, which encodes nonmuscle myosin-II heavy chain and a mutation in *RhoGEF2*, a guanine nucleotide exchange factor that regulates myosin activity through the RhoA small GTPase) produces a visible malformed (mlf) phenotype at a penetrance of 30% and the stock becomes sensitive to reduced levels of a third gene or interactor. Using the deficiency kits (180 stocks), 30 regions of the genome required for both *zip* and *RhoGEF2* function were identified. 526 ndividual loci uncovered by these deficiencies were tested and 18 mutants strongly enhance while 74 mutants strongly suppress (74) the mlf phenotype. (This study was performed at Duke University in the laboratory of Dr. Daniel Kiehart).

2:15 p.m. BIO-32 Dose-dependent effects of ethanol exposure on development in embryonic rat cortical neurons. S. BINGHAM, L.M. MUDD, T. LOPEZ, and J.R. MONTAGUE. SNHS-Biology, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161. This study determined the ethanol concentrations that produced detrimental effects on the development of embryonic cortical neurons because mental capacity appears to be proportional to the level of dendritic arborization. Neurons from fetal rat cortices were grown in culture in close proximity to a glial plane. The cells were treated with concentrations of ethanol from 45 mM to 450 nM, then neurite outgrowth was quantified. A significant decrease in dendritic branching was observed at ethanol levels as low as 45 µM after 6 days of ethanol exposure in vitro whereas changes in primary neurite outgrowth were observed at an ethanol concentration of 4.5 µM. This finding is of particular interest as it seems to indicate that that occasional ethanol exposure is detrimental to cortical development at very low concentrations. (funded partly by NIH-NIGMS MBRS Grant, GM 45455 and North Ridge Cancer Foundation, *Inc.*)

2:30 p.m. BIO 33 Reversal of β-amyloid toxicity on septal neurons by growth factors and estrogen. P. ASSIS, A.J. SANCHEZ, H. DOWLING, B.R. GARCIA and L.M. MUDD. School of Natural and Health Sciences, Barry University, 11300 NE 2nd Avenue, Miami Shores, FL 33161. The septal nucleus is at particular risk in Alzheimer's disease (AD) where senile plaques have been found that contain high concentrations of β-amyloid (BA). A treatment of 10uM BA has been found to decrease the survival of septal neurons and an attempt is made here to reverse the effects of BA by subsequent treatment with growth factors and estrogen. Cells were cultured in bilaminar planes of astrocytes and neurons from day 16 embryonic rats. Neuronal survival was measured by fluorescence. BA (10uM) treatment was administered on day in vitro (DIV) 1 and DIV 4 followed by estrogen

(10nM), insulin-like growth factor I and II (10ng/ml), basic fibroblast growth factor (5ng/ml) or nerve growth factor (100ng/ml) on DIV 4 and 5. IGFII appeared to have the greatest effect (55.3%). Supported by NIH MBRS grants #45455 and Rise #IR25 GM9244.

2:45 p.m. BIO-34 Dose-dependent neurotoxicity of β-amyloid on septal glial cells. B.R. GARCIA, A.J. SANCHEZ, and L.M. MUDD. School of Natural and Health Sciences, Barry University, 11300 NE 2nd Avenue, Miami Shores, FL 33161. Alzheimer's disease (AD) is characterized by senile plaques, which contain high levels of β-amyloid (BA) protein. The effect of dose dependent BA on septal glia was quantified by diamidino 2-phenyl indole (DAPI) fluorescence. Glial cells previously cultured from embryonic day 16 rats were transferred onto silane-treated coverslips on day in vitro (DIV) 0. The cells were subsequently treated with 0.1uM, 1uM, or 10uM BA or control on DIV 0, DIV 1, and DIV 2. To quantify effects of BA, cells were counted on DIV 0, DIV 1, DIV 2 and DIV 3. 10uM BA appeared to have a toxic effect on septal glia. This outcome, if significant, will indicate that glial cells may also be affected by BA in Alzheimer's disease. Supported by NIH MBRS grant # 45455 and MBRS Rise # IR25 GM9244.

3:00 p.m. BIO-35 Survival of septal neurons after treatment with β-amyloid protein. K. LAVALLEE, V. GRIECO, P. ASSIS, A. J. SANCHEZ, B. R. GARCIA, and L. M. MUDD. School of Natural and Health Sciences, Barry University, 11300 NE 2nd Avenue, Miami Shores 33161. The senile plaques of Alzheimer's disease (AD) contain a high concentration of β-amyloid (BA) protein which affects the neuronal population in the septal nucleus. Cells were treated with three doses of BA to ascertain which is most toxic and survival was quantified by florescence. To test this, astrocytes and neurons from embryonic day-16 rats were grown in serum-free media in a bilaminar culture. The cultures were treated on day in vitro (DIV) 1 and DIV 4 with 0.1uM BA, 1uM BA, and 10 uM BA. On DIV 6, the live cells were visualized and quantified with florescine diacetate (FDA) and dead cells with propidium iodide (PI). Preliminary data showed survival of neuronal populations is most effected by 10uM BA, 51.6% versus 71.5% control, indicating a possible effect of 10uM BA. Supported by NIH MBRS grant # 45455 and MBRS Rise # IR25 GM9244.

3:15 p.m. BIO-36 Growth factor reversal of β-amyloid effect on septal glial cells. A.J. SANCHEZ, B.R. GARCIA and L.M. MUDD. School of Natural and Health Sciences, Barry University, 11300 NE 2nd Avenue, Miami Shores 33161. Beta-amyloid (BA) is found in the senile plaques of Alzheimer's disease (AD) and is thought to contribute to memory loss in

AD. The effect of BA on glial cells, the supporting cells of neurons, was quantified by Diamidino 2-Phenyl Indole (DAPI) fluorescence. Septal glia were transferred to silane-treated coverslips on day in vitro (DIV) 0 and subsequently treated on DIV 0, DIV 1, and DIV 2 by either 10uM BA or control. To reverse the effects of 10uM BA, glial cells were treated with growth factors (NGF, IGFI, IGFII, and bFGF) and estrogen. Cells were quantified on DIV 0-3 and on DIV 6. A trend in long term effects of reversal on DIV 6 suggests that bFGF and IGFI had the greatest reversal with an average of 154 and 135 cells surviving relative to 79 cells surviving for BA control. Supported by NIH MBRS grants # 45455 and MBRS Rise # IR25 GM9244.

Biology Posters

POS-3 The Therapeutic Potential of Pomegranate (Punica granatum) Extracts in Testicular Cancer. J. KUMI-DIAKA (1), J. BROWN (1), E. LANSKY (2). (1) Department of Biological sciences, Schmidt College of Science, Florida Atlantic University Davie, FL 33314. (2) Rimonest Ltd., Science Park Technion, Israel. A battery of assays was used to determine the chemosensitivity of testicular cancer cells, TM3 and GC1-spg, in vitro to pomegranate extracts alone and in combination treatments. Growth inhibition and treatment induced cytotoxicity was determined using 3-[4,5-dimethylthiazol-2-yl]-2-, 5-diphenyltetrazolium bromide (MTT) and lactate dehydrogenase (LDH). Apoptosis assays; Acridine Orange/Ethidium Bromide fluorescent dye, Annexin V-FITCH, terminal deoxynucleotidyl transferase (TdT)-mediated dUTP nick end labeling (TUNEL), were used to determine the type of treatment induced cell death (apoptosis or necrosis). Results indicated that both extracts induced significant cytotoxic effect on testicular cancer cells alone and in combination. And that when compared to single treatments, cells exposed to combination treatment were more prone to apoptotic cell death, indicating the possibility of synergism. While in vitro studies lack biological activities of homeostasis, these studies will pave the way for in depth in vivo studies to assess the potential therapeutic capability of pomegranate.

POS-4 Short-term experimental impacts of boat wakes on intertidal oyster reefs (*Crassostrea virginica*): a comparison between South Carolina and Florida sites. L. WALTERS (1), L. COEN (2), P. SACKS (1), J. GREVERT (1), and J. STINER (1). (1) Dept. of Biology, Univ. of Central FL, Orlando, FL 32816, (2) S.C. Dept. of Nat. Resources, Marine Resources Res. Inst., Charleston, SC 29412. Using a variety of hull designs, engine profiles and velocities, we are experimentally looking at the impact of recreational boating on oyster reefs in two of the dominant habitat types (narrow tidal channels in SC, shallow-water estuaries in FL) in the southeastern United States. In replicated trials, we measured shell dispersal, turbidity, wind speed, and flow rates generated after each boat pass. Wind alone rarely moved shells. However, significant shell movement and turbidity spikes were associated with boat generated wakes. The results were especially dramatic on the sheer SC slopes of tidal channels and on reefs in estuaries where prior activity (harvesting or die-offs) has created steeply-sloped, unstable accumulations of disarticulated shells.

POS-5 Depredation of *Caretta caretta* (Testudines: Cheloniidae) nests by *Lanelater sallei* (Coleoptera: Elateridae) larvae on Key Biscayne. J.H. TOWNSEND (1), E.M. DONLAN (2), and E.A. GOLDEN (2). (1) Division of Herpetology, Florida Museum of Natural History, Gainesville, FL 32611, (2) Bill Baggs Cape Florida State Park, 1200 S. Crandon Blvd, Key Biscayne, FL 33149. Marine turtle nests are subject to depredation by a variety of predators. In 2001, beetle larvae were observed in *C. caretta* nests at Cape Florida State Park (CFSP), apparently predating upon the eggs. In 2002 and 2003, the impact of these larvae was examined more closely, and larvae were reared for identification. The beetles, *Lanelater sallei*, were the most destructive *C. caretta* egg predators at CFSP during the study. In 2003, 75% of nests contained larvae-damaged eggs while <12% of nests were depredated by raccoons and <4% were depredated by crabs. Raccoon predation was reduced in 2003 compared to other years. Many volunteer nest evaluators assisted in this project.

POS-6 Infrared imaging in vipers: differential responses of crotaline and viperine snakes to paired thermal targets. A.B. SAFER and M.S. GRACE. Dept. Life Sci., Florida Inst. of Tech., Melbourne, FL 32901. Viperine snakes of the genus *Bitis* possess richly innervated supranasal sacs hypothesized to be functionally analogous to the pit organs of pit vipers. We compared behavioral responses of pit vipers and snakes of the genus *Bitis* to paired targets of different temperatures (i.e. cool and warm balloons), some scented with rodent odors. Behavioral responses of pit vipers were significantly higher toward warm targets than toward cool ones. Moreover, they all were significantly higher in pit vipers than in the viperines tested. *Bitis* sp. exhibited no significant differences in their behaviors with respect to target temperatures. These results suggest that the behavioral correlates of targeting differ significantly between these two groups of snakes, and that the neural substrates of infrared imaging in crotaline snakes are either absent or functionally distinct in *Bitis* sp.

POS-7 Body size estimation in polar bears. J. LAIBLE, J.M. WATERMAN, J.D. ROTH and G. ECKHARDT. Dept. of Biology, Univ.

of Central Florida, Orlando, FL 32816. Body size and condition are important determinants of reproductive success in polar bears. However, estimates of body size of large mammals are often difficult to obtain in the field. We have developed a non-invasive method of estimating actual body size, relative body size, and an index of body condition of free-ranging polar bears in western Hudson Bay. Using digital imagery of objects of known size and distance, we developed a calibration equation relating distance to size. Repeated images of bears at different times and distances produced consistent estimates of size and condition. Using these estimates, we compared rates of behaviors with body size and found that social interactions were strongly influenced by the size and condition of the interactors. This technique is applicable to a variety of species of large animals in which body size estimation is problematic.

POS-8 Multi-scale spatial analysis of Bottlenose dolphin (*Tursiops truncatus*) stranding patterns in the Indian River Lagoon, FL. N.A. MARTINEZ (1,2), J.F. WEISHAMPEL (1), W.D. NOKE (2), M.K. STOLEN (2), V. LARSON (3), D.K. ODELL (2). (1) University of Central Florida, Department of Biology, Orlando, FL 32816, (2) Hubbs-SeaWorld Research Institute, Orlando, FL 32821, (3) Dynamac Corporation, Cape Canaveral, FL 32920.

COMPUTER/MATHEMATICAL SCIENCES

FRIDAY 8:30 a.m. – ENGINEERING BUILDING-1 227
S. BONDARI & J. WHITE, SAINT LEO UNIVERSITY, presiding

8:30 a.m. CMS-1 A comparison of two different models of teaching at Saint Leo University. S. BONDARI. Dept. Mathematics and Sciences, Saint Leo University, Saint Leo, FL 33574. The online statistics course was developed at Saint Leo University over five years ago. Since then nearly 500 students have taken the course through the Center for Online Learning. Even though both the online and the University Campus instructors follow the same curriculum guide, the instruction methods and the students' backgrounds are significantly different.

8:45 a.m. CMS-2 Using matrix models for teaching ecology in the classroom. C. MILLER and M. VO. Dept. Mathematics and Sciences, Saint Leo University, Saint Leo, FL 33574. Matrix models, such as Leslie matrices, may be used to help understand and predict the rate of population growth of organisms. Furthermore, matrix models may be used to understand ecosystems by tracking flows of matter and energy. We discuss how these might be used by students in the classroom as a useful application in understanding matrices and the limitations they present as a tool for ecologists.

9:00 a.m. CMS-3 Technology in statistics. J.A.WHITE. Dept. Mathematics and Sciences, Saint Leo University, Saint Leo, FL 33574. Technology can be utilized to enhance student visualization and understanding of many topics in Introduction to Statistics. Some comparisons will be made using Statdisk, Minitab, Excel and the TI-83 calculator.

9:15 a.m. BREAK

9:30 a.m. CMS-4 Application of Soft Computing for Parameter Optimization in a Fuzzy-Neural Network (FNN). H.P. SATPATHY. Department of Math. and Computer Science, Barry University, Miami, FL 33161. The paper presents a new approach to optimize a hybrid Fuzzy-Neural Network (FNN) using soft computing concepts. One of the soft computing methodologies like Genetic Algorithms (GA) is attempted to search for the optimized weights and rules of the FNN. In our approach, the adjustable parameters of the network like- connecting weights and fuzzy rule nodes are viewed as constraints that we impose on the soft computing process during the learning phase of the FNN model. The GA tuned Fuzzy-Neural Network is used to forecast daily peak and average loads. The forecasting accuracy is found to be significant in comparison to standard Fuzzy and Neural Network approaches. The forecast is capable of dealing with holidays, weekends, and special events and is highly updatable.

9:45 a.m. CMS-5 Structural optimization of an Artificial Neural Network based on the Back propagation technique. H.P. SATPATHY and T. RAHAMAN. Department of Math. and Computer Science, Barry University, Miami, FL 33161. This paper presents detail study to find the best possible configuration of an Artificial Neural Network (ANN) model based on the back-propagation technique for forecasting of electric load. In our study we tried to find the best possible inputs and number of hidden nodes for the ANN model for optimal performance. This structural optimization is essential for faster learning and suitability of the model in real time implementations. The results present a through study on various aspects of the model optimization.

10:00 a.m. BUSINESS MEETING: COMPUTER/MATH. SCIENCES
SIAMACK BONDARI & JACCI WHITE, presiding

ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCES

FRIDAY 9:00 a.m. – ENGINEERING BUILDING-2 302
SESSION A
KRISTEN SPOTZ, UCF, presiding

9:00 a.m. ENV-1 Academic appointments in chemistry---now and then. D.F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. The present system of academic appointments in chemistry in four-year colleges and universities consists of tenure-track and adjunct appointment options. The latter system seems to be descended from a system called "camul" that was developed in mid-Nineteenth Century France in response to budget constraints. The parallels between now and then, and the consequences will be reviewed.

9:15 a.m. ENV-2 Structural studies of an engineered calcium-binding bacterial phospholipase-C. D.O. APIYO (1) and T.L. SELBY (1,2). Dept. of Chemistry (1) and Biomolecular Sciences Program (2), Univ. of Central Florida, Orlando, FL 32816. Metal ions play significant roles in many biological systems. The metal may act as a nucleation site from which the polypeptide folds, thus imparting structural stabilization to the enzyme or it may instead be responsible for the enzyme's thermodynamic stability coupled to its role in enzymic function. Metal binding sites are therefore attractive targets in protein engineering. The catalytic active-site of a bacterial phospatidyl calcium independent phospholipase C was recently modified to create a calcium binding enzyme (R69D) in an effort to understand the catalytic role of calcium in signal transduction. X-ray crystallographic studies of the engineered enzyme reveal that the bound calcium occupies a similar position as the guanidinium side chain (involved in catalysis in bacterial phospholipase Cs) of the arginine in the wild type enzyme. The calcium is ligated to two protein ligands (Asp37 and Asp73 corresponding to Asp33 and Arg69 in the wild type) and a water molecule from the solvent. This results into a distorted tetrahedral geometry which differs remarkably from the octahedral geometry observed in the calcium-dependent mammalian phospholipase C's. Interestingly, the two catalytic histidines (His36 and His86) both have their conformations significantly altered (from the wild type) upon calcium-binding, with their imidazole side-chains oriented toward the metal. In contrast, the catalytic ligands of the calcium-dependent mammalian phospholipase Cs are distanced much further away from the calcium and have an outward orientation of their imidazole side chain. It is apparent that the calcium in the engineered enzyme is involved in local structural stability that may result into a change in mechanism of catalysis for bacterial phospholipase Cs.

9:30 a.m. ENV-3 Structure determination of cancer and metabolic disease related proteins. S. OZYURT (1) and T.L. SELBY (1,2). Dept. of Chemistry (1) and Biomolecular Sciences Program (2), Univ. of Central Florida, Orlando, FL 32816. Bioinformatics and proteomics studies have been initiated to elucidate the role of ~200 proteins involved in cancer and 30 enzymes involved in metabolic diseases. To understand the mechanism of action for cancer proteins and enzymes, we are using structure determination via x-ray crystallography and 'Fold' recognition via molecular modeling to determine the structural and functional roles of each protein in disease progression. Following these studies, we will attempt to develop therapies based on our findings. Cancer therapies will be developed based on the overall three dimensional structures of the proteins and our data will provide insight into each protein's mechanism of action in cancer progression. For the metabolic disease proteins, we will use the structural data based on the enzyme's active site structure to design drugs which can inhibit a number of different enzymes in metabolic junction pathway systems allowing for the proper balance of metabolites to be restored.

9:45 a.m.ENV-4 Electrolytic codeposition of nickel and titanium on magnesium metal for hydrogen storage and retrieval. E. PEREZ , M. HAMPTON, M. FRANJIC, and J. LOMNESS. Dept. of Chemistry, Univ. of Central Florida, P.O. Box 162366, Orlando, FL 32816-2366. Studies by the N.A.S.A. have shown a substantial amount of hydrogen fuel evaporates while the shuttle awaits departure. Remediation of this expenditure of fuel can be accomplished through the use of compounds which will readily consume the discharge. This presentation shows the process by which codeposition of nickel and titanium on magnesium metal will result in the formation of an active complex for hydrogen storage and retrieval. Applying a 15 V current to a strip of Mg metal immersed in a 0.23 M $NiSO_4 \cdot 6H_2O$ solution slurry with 125-mesh Ti powder allowed for electrolysis of the mixture and complete film formation. Film reactivity was examined by Differential Scanning Calorimetry.

10:00 a.m. ENV-5 Effect of Ti_xAl_y catalysts on hydrogen storage properties of $LiAlH_4$ and $NaAlH_4$. M. FRANJIC (1), J. LOMNESS (1), M.D. HAMPTON (1), and D.K. SLATTERY (2). (1) Department of Chemistry, University of Central Florida, Orlando, FL 32816-2366, (2) Florida Solar Energy Center, 1679 Clearlake Rd., Cocoa, FL 32922.The hydrogen release characteristics of $LiAlH_4$ and $NaAlH_4$ were studied in relation of two titanium aluminum alloys using a dry preparation technique consisting of the ball milling of $LiAlH_4$ or $NaAlH_4$ and Ti_xAl_y mixtures. The dopants included $TiAl_3$, Ti_3Al, elemental titanium, and elemental aluminum. Ball milling in the absence of the catalyst was found to decrease the release temperature of hydrogen. Doping $LiAlH_4$ with Ti_3Al, $TiAl_3$ and elemental aluminum additionally reduced temperature required for hydrogen release. That effect wasn't observed for mixtures with $NaAlH_4$.

10:15 a.m. ENV-6 Hydrogen recovery using metal alloys. M.T. OZTEK, M.D. HAMPTON, J. LOMNESS, and D. CAUCEGLIA. Dept. of Chemistry, Univ. of Central Florida, Orlando, FL, 32816. Considerable amounts of hydrogen is lost through boil off from storage systems at the Kennedy Space Center. Intermetallic compounds and alloys that are known to reversibly absorb hydrogen were investigated for recovery of this boil off hydrogen. A stainless steel isothermal reactor was constructed with pressure transducers installed at the inlet and outlet points. The exit stream was directed to a gas chromatograph and a digital flowmeter. With this system, the pressure drop across the absorbing bed as well as the composition of the exiting gas were measured while the temperature, pressure, and flow rate were controlled. The resulting data provided information on the hydrogen uptake rates and capacities of various alloys of Zr, V, and Ni as a function of pressure, temperature, and flow rate as well as alloy composition. The effects of cycling were also determined.

10:30 a.m. BREAK

10:45 a.m. ENV-7 Assessment and *in vitro* repair of damaged DNA templates. A. HALL (1,3) and J. BALLANTYNE (1,2,3). (1) Graduate Program in Biomolecular Science, University of Central Florida, PO Box 162366, Orlando, FL 32816-2366, (2) Department of Chemistry, University of Central Florida, PO Box 162366, Orlando, FL 32816-2366, (3) National Center for Forensic Science, PO Box 162367, Orlando, FL 32816-2367. DNA extracted from biological stains is often intractable to forensic analysis. Remedies may be available to the forensic scientist to deal with causative factors such as LCN templates and soluble inhibitors but none presently exist for damaged DNA. In fact, knowledge of the biochemical nature and the extent of DNA damage in physiological stains is rudimentary at best. The primary aims of this work were first ascertain the types of DNA damage encountered in forensically relevant stains, correlating the occurrence this damage with the partial or total loss of a genotype, and then to attempt the repair of the damage by means of *in vitro* DNA repair systems.

11:00 a.m. ENV-8 mRNA profiling: body fluid identification using multiplex RT-PCR. J. JUUSOLA and J. BALLANTYNE. Dept. of Chemistry, Univ. of Central Florida, Orlando, FL 32816. We report the development of a multiplex RT-PCR method for the definitive identification of the body fluids most commonly encountered in forensic casework analysis, namely blood, saliva, semen, and vaginal secretions. The methodology is based upon gene expression profiling analysis in which body fluid-specific genes are identified by detecting the presence of appropriate mRNA species. The use of fluorescent dye-labeled primers allows PCR products to be separated and detected with capillary electrophoresis/laser-induced fluorescence technology, with the resulting profile identifying those body fluids that are present in the sample as a single or mixed stain. An mRNA based approach, such as the multiplex RT-PCR method described here, could supplant the battery of serological and biochemical tests currently employed in the forensic serology laboratory.

11:15 a.m. ENV-9 Comparison of spectrophotometric and HPLC estimations of chlorophylls-*a*, -*b*, -*c* and pheopigments in Florida Bay seston. J.W. LOUDA and P. MONGHKONSRI. Organic Geochemistry Group, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431. This study was prompted by spread in the data from a 1996 seven-laboratory inter-laboratory comparison of chlorophyll determination in Florida Bay. The present report covers the analysis of 244 water samples from Florida Bay collected during monthly sampling events (09/00 – 06/02). The spectrophotometric determination of chlorophyll-*a* (CHL*a*), using 5 separate published equations and 1 commercial program (ChlCalc™), gave quite acceptable results ($y = 0.9169 - 1.0914X$; $R^2 = 0.9361 - 0.9987$; X=HPLC) for CHL*a*. Pheopigment analysis with the commercial program was better ($y = 1.0631X$, $R^2 = 0.463$) than the classic (Lorenzen, 1967) determination ($y = 11.178X$, $R^2 = 0.0271$), but it too proved inadequate. Comparisons of the determination of the chlorophylls-*b* or $-c_1$ / $-c_2$ by spectrophotometry versus HPLC derived data showed that such measures were highly inaccurate, as R^2 values were close to zero (-0.16 to 0.04) and the slope ("m" in $y = mX$) gave overestimations of 1.8 – 5.6. It is concluded that valid CHL*a* estimates can indeed made using spectrophotometric measures on 90% acetone extracts of Florida Bay seston (Whatman GF/F filters). However, it is also concluded that no meaningful estimates of pheopigments or alternate chlorophylls ($-b$, $-c_1$ / $-c_2$) are possible using polychromatic equations, on Florida Bay bioseston.

11:30 a.m. ENV-10 Water quality analyses of canals in the agricultural/residential community of Loxahatchee Groves, Florida. J. OSETEK and J.W. LOUDA. Dept. of Chemistry and Biochemistry and the

Environmental Sciences Program, Florida Atlantic Univ., Boca Raton, FL 33431. Loxahatchee Groves is an 8,000 acre community (est. 1917) that is zoned agricultural/resident (Ag/Res). Wellington to its south has a huge equestrian population. As part of the Comprehensive Everglades Restoration Plan (CERP), Wellington, must reduce its phosphorous export to the Everglades (WCA-1). Thus, Wellington has implemented a set of best management procedures (BMPs), including the export equestrian wastes. Loxahatchee Groves lands have received considerable amounts of these wastes. Given the suspected nursery and equestrian impact on the quality of waters in this Chapter 298 water control district, we undertook a preliminary assessment of these waters, which eventually drain into the C-51 system. While certain ‘hot spots’ were identified, waters in the southern reaches of Loxahatchee Groves were in line with that present in C-51 proper. Overall, phytoplankton biomass (Chlorophyll-*a* = 2.4 – 7.2 mg/m^3) and community structure (HPLC derived; chlorophytes>diatoms> cyanobacteria$\geq$ cryptophytes) indicate an early eutrophic setting with an abundance of nitrogen (N:P = 40 –71:1). We analyzed for total CHL*a*, photosynthetic pigments, nitrite, nitrate, phosphate (SRP), sulfate, iron, pH, dissolved O_2, turbidity, conductivity, chemical oxygen demand. The results from this limited (2 events) and preliminary sampling / monitoring program are discussed.

11:45 a.m. BUSINESS MEETING: ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCES
KRISTEN SPOTZ, presiding

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-2 302
SESSION B
KRISTEN SPOTZ, UCF, presiding

2:30 p.m. ENV-11 Initial evaluation of organotin monomers and polymers as potential anticancer agents. R.D. DOUCETTE, D.W. LOUDA , and C.E. CARRAHER. Dept. of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton, FL 33431. A large number of metal-containing compounds show significant activity against cancer cells, and incorporating a metal into a polymer offers several possible advantages. Compounds of the type R_2SnCl_2 (R=methyl, ethyl, propyl or butyl) were tested for the ability to inhibit the growth of CAOV3 cells (human ovarian carcinoma cells). Polymers of 2-chloro-p-phenylenediamine and the same organotin chlorides were synthesized and tested as well. For both the monomers and the polymers, the pattern of growth inhibition relative to the R groups was butyl > propyl > ethyl > methyl; as the number of carbon atoms increases in the R group, the growth inhibition increases. This and other aspects of the structure-activity relationships of the polymers will be discussed.

2:45 p.m. ENV-12 The University of South Florida (USF) Department of Chemistry at 40 years. D.F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. The USF Department of Chemistry gained Department status in 1964. In that time, it has grown from a faculty of 10 to over 30, developed a graduate program at the masters level (1965), then at the doctorate (1968). The faculty have tried to achieve a good balance between teaching and research, between undergraduate and graduate education. We recently were credited with ranking seventh in the production of chemistry majors in the nation and the first chemistry graduate was elected to membership in the National Academy of Sciences in 2003. A recent survey by Professor Michael J. Zaworotko provided hard numbers for the start-up costs for faculty versus the payoff.

3:00 p.m. ENV-13 The effect of light intensity on the growth of duckweed, *Lemna Minor*. L. ANDERSON and D.F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, FL 32620. A variety of parameters affect plant growth. Plants respond to light depending on intensity, wavelength, and illumination periods. This study measured the growth of *Lemna Minor* under regulated conditions of light by three specific intensities originated from blue, green, and red plastic colored panels as limiting growth factor. Periods of illumination occurred every twelve hours and the study was performed in periods of fifteen days. Results showed that when these variables were controlled and applied to duckweed, the rate of growth was affected favoring those of red color of the spectral region.

3:15 p.m. ENV-14 Use of chemically modified attapulgite, kaolinite and montmorillonite in the removal of cadmium(II), copper(II), lead(II), nickel(II) and silver(I) ions. N. KRIKORIAN and D.F. MARTIN. Institute for Environmental Studies, Department of Chemistry, University of South Florida, 4202 East Fowler Avenue, Tampa, Florida 33620. Current research focuses on the extractions of heavy metals from plants or aqueous media. Attapulgite, a needle-like clay mineral, kaolinite, a two-layered clay, and montmorillonite, a three-layered expanding clay are three types of clays used in this study due to their availability. The three clays are chemically modified with N,N'-Bis-(2-hydroxyethyl)-dithioxamide and β-hydroxyethyl mercaptan and used in the extractions of cadmium(II), copper(II), lead(II), nickel(II) and silver(I) ions from standard solutions. While attapulgite is still under study, heavy metals were successfully extracted from montmorillonite, but kaolinite was not successfully modified.

3:30 p.m. ENV-15 Use of emulsified zero valent iron for *in situ* heavy metal contaminant removal. K.M. MILUM (1), C.L. GEIGER (1), C.A. CLAUSEN (1), R. DEVOR (1), J. QUINN (2). (1) Dept. of Chem, Univ. of Central Fla, Orlando, FL, 32816, (2) Kennedy Space Center, FL 32899. The use of zero-valent iron (Fe^0) is an *in situ* remediation technique currently undergoing evaluation. We have attempted to demonstrate the application of the combination of this technology with that of emulsion liquid membranes, emulsified zero-valent iron (EZVI), to treat sediments with heavy metal contamination. Emulsions were prepared using vegetable oil, water, 3-10 micron iron, and Span 85. The results presented in this study demonstrate that EZVI is viable technique for *in situ* remediation of heavy metals in sediments. Laboratory studies have shown that EZVI is capable of removing heavy metals such as lead, chromium, and cadmium from aqueous solution and removal of lead and cadmium from soil at levels as high as 57% after three weeks.

3:45 p.m. ENV-16 Duckweed and phosphate process water: biomass fuel cell potential. K.M. CARVALHO-KNIGHTON (1), B. CLARK (1), and R.F. BENSON (2). (1) Department of Environmental Science and Policy, University of South Florida St. Petersburg, 140 7th Avenue South, St. Petersburg, FL 33701, (2) Department of Marine Science, Center for Ocean Technology, University of South Florida St. Petersburg, 140 7th Avenue South, St. Petersburg, FL 33701. In Florida, the phosphate mining industry is concerned with the impacts on the environment. One of the concerns is that phosphoric acidic process water (pond water) is very acid with a pH less than 2. Research has shown that Duckweed, *Lemnaceae*, can both purify and concentrate metals and nutrients in water. Lab studies were conducted investigating the possibility of utilizing duckweed and the process water in a biomass fuel cell.

Environmental/Chemistry Posters

POS-9 Optical means for improving the resolution of multi-photon three-dimensional lithographic microfabrication. T. JABBOUR, F. RUHGE, and S.M. KUEBLER. School of Optics/CREOL/FPCE and Dept. of Chemistry, Univ. of Central Florida, Orlando, FL 32816. Multi-photon three-dimensional microfabrication (3DM) is a photo-patterning technique that enables free-form generation of 3D solids having micron and sub-micron sized features using a wide range of materials. As it is most commonly applied, an ultra-short pulse laser is tightly focused into a medium that can be polymerized upon multi-photon excitation (MPE). The nonlinear dependence of the excitation rate and the polymerization rate on intensity cause the polymerization to be confined to a small volume located at the focus. The target 3D form is generated by patterned scanning of the focal point within the medium and removing the surrounding unexposed material in a subsequent development step. The size of the smallest feature that can be generated, and thus the limiting resolution, is determined by the optical parameters of the excitation geometry and the physical and chemical response of the material to MPE. We propose a method for improving the resolution of 3DM that is based on an optical scheme for altering the intensity distribution at the focus.

FLORIDA COMMITTEE ON RARE AND ENDANGERED PLANTS AND ANIMALS

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-2 105
JACK STOUT, UNIVERSITY OF CENTRAL FLORIDA, presiding

2:00 p.m. RES-1 Spatially explicit disturbance-demographic model for a federally-listed Florida scrub plant species. P F. QUINTANA-ASCENCIO (1) and E.S. MENGES (2). (1) Dept. of Biology, Univ. of Central Florida, Orlando, FL. 32816. (2) Archbold Biological Station, 123 Main Drive, Venus, FL 33960. We developed and tested an individual-based simulation model summarizing the spatial patterns of two Florida scrub plants: scrub hypericum (*Hypericum cumulicola*), and Florida rosemary (*Ceratiola ericoides*). Our model predicts post-fire population dynamics using: (1) survival, growth, and recruitment data of scrub hypericum (2) Florida rosemary growth plant size and distance to conspecific neighbors; (3) a beta dispersal function for scrub hypericum; (4) and seed and seedling data. Model predictions were verified by contrasts with observed data. Our simulations mimicked the patchy distribution of scrub hypericum within the landscape, with higher densities in larger gaps, and indicated higher probabilities of decline with time-since-fire in landscapes with fewer scrub hypericum and higher densities of Florida rosemary. This spatially explicit, individual-based model improves the precision of prior matrix projections that did not include Florida rosemary or spatial structure.

2:15 p.m. RES-2 Rare plants of Canaveral National Seashore. P.A. SCHMALZER and T.E. FOSTER. Dynamac Corporation, DYN-2, Kennedy Space Center, FL 32899. We began a floristic survey of selected areas on Canaveral National Seashore in 2002. We also revisited locations of listed plants identified previously. Coastal strand and scrub are important for *Lantana depressa* var. *floridana* (SE), *Glandularia maritima* (SE), *Chamaesyce cumulicola* (SE), *Tephrosia angustissima* var. *curtissii* (SE), *Myrcianthes fragrans* (ST), *Opuntia stricta* (ST), and *Scaevola plumieri* (ST). *Lechea divaricata* (SE) and *Pteroglossaspis ecristata* (ST) occur in oak scrub, particularly areas recently burned. *Ophioglossum palmatum* (SE) is epiphytic on *Sabal palmetto* in a few hammocks. *Tillandsia fasciculata* (SE) and *T. utriculata* (SE) are also epiphytic in hammocks. One population of *Nemastylis floridana* (SE) is known. *Argusia gnaphalodes* (SE) and *Harissia simpsonii* (SE) appear to have been eliminated by freezes in the 1980s. Plants listed as commercially exploited include *Osmunda cinnamomea*, *O. regalis*, and *Zamia pumila*.

2:30 p.m. RES-3 Distribution and population status of the endangered scrub lupine, *Lupinus aridorum*. S.R. KANE. Dept. of Biology, Univ. of Central Florida, Orlando, FL 32816. Sites of known *Lupinus aridorum* historical occurrences and extant populations were mapped by global positioning system technology (GPS). Populations were censused in 2002 and 2003 to establish current abundance, which was compared with historical records of species abundance. Underlying soil type, elevation and vegetation communities associated with species occurrence were examined. The number of extant populations declined from 23 in 1998 to 10 in 2003. There are fewer than 1100 non-seedling individuals in 2003, which is about 63% of the 1998 number. The greatest number of plants grow in St. Lucie soil: 40% of the sites are on this soil and contain 81% of the non-seedling plants. Site elevations range from 29 to 55 meters. All sites but one are in sand pine-rosemary scrub; one site is in a sandhill community.

2:45 p.m. RES-4 Reproductive synchrony in the state listed Lilium catesbaei. K.M. PENNEY (1), G.A. FOX (2), and C.S. FLEGEL (1). (1) Pinellas County Brooker Creek Preserve Biological Research Station, Tarpon Springs, FL 34688, (2) University of South Florida, Tampa, Fl 33620. Studies have shown that pollinator-plant relationships are an important selective force on flowering phenology. More recently, researchers have examined the relative importance of predation and herbivory in shaping flowering phenology. Our study examines reproductive synchrony in *Lilium catesbaei*, specifically to determine the relative contribution of herbivory and pollination on seeding success and the roles of these factors in evolution of flowering time. Preliminary analyses indicate that synchronous bloomers are more likely to be pollinated than asynchronous bloomers in most years. The effect of herbivory on seeding success is less variable throughout the blooming period. Further analyses of these factors is examined between years and between sites within years to determine whether the relative affect of these two factors vary in time and space.

3:00 p.m. BREAK

3:15 p.m. RES-5 Juvenile green turtle (*Chelonia mydas*) feeding selectivity along the algae dominated Sabellariid worm reef, Sebastian Inlet, Indian River County, FL. E.I. GILBERT. University of Central Florida, Department of Biology 4000 Central Florida Blvd. Orlando, Fl 32816. Research pertaining to green turtle foraging ecology remains inconclusive with regards to feeding selectivity. Green turtles are considered generalists; however, work in Australia has shown that juvenile green turtles preferentially feed upon algae although seagrass dominates available forage. Juvenile green turtles inhabit the Sabellariid worm reefs south of Sebastian Inlet, Indian River County, FL. Over 100 species of algae are known to grow on these reefs. It has been documented that the juvenile green turtles of the Sabellariid reef south of Sebastian Inlet consume at least 15 species of algae. My research focuses on the foraging ecology of these turtles. I specifically ask if these turtles are generalists or if they prefer certain species of algae to others. To determine feeding selectivity I obtained lavage samples from juvenile green turtles residing over the Sabellariid reef. Within the same season, I conducted six transects where I collected all algae contained within five quadrats at ten meter intervals for 100 meters. To determine feeding selectivity I compare the frequency of each algae species in lavage samples to the prevalence of each of these species in the habitat.

3:30 p.m. RES-6 Fatty acid composition in the yolk of green sea turtles, *Chelonia mydas.* K.S. CRAVEN (1), G. SEABORN (2), J. PARSONS (3), S. TAYLOR (1), and D.W. OWENS (4). (1) Armstrong Atlantic State University, Savannah, GA 31419, (2) National Marine Fisheries Service, Charleston, SC 29412, (3) Cayman Turtle Farm, British West Indies, (4) Charleston University, Charleston, SC 29412. Egg yolks are packaged by female amniotes for use by their offspring. Yolk lipids and their component fatty acids can be traced to dietary sources and are important for normal embryonic growth and survival. This study focuses on the role of fatty acids in the success of green turtle eggs. Wild green turtles have better hatch success than captive. Eggs were sampled from turtles in captivity and the wild. Food and yolk samples were analyzed using gas-liquid chromatography. Different levels of several fatty acids were found in the yolks of wild and captive animals. Compared to levels of fatty acids in their respective food sources, green sea turtles package lipids in their yolks in proportions different than those in their diets.

3:45 p.m. RES-7 Modeling sea turtle clutch temperature and development based on air temperature and sand characteristics. M. MOTA and R. CARTHY. Dept of Wildlife Ecology and Conservation, U. Florida, Gainesville, FL 32611. Marine turtles bury their eggs on sandy beaches to incubate and hatch. The substrate in which these eggs are buried plays a major role in determining hatchling growth rates, developmental times, and sex. Because abiotic factors, such as air temperature and sand characteristics, influence the properties of the substrate, a model was developed to explain how these abiotic factors influence sea turtle embryonic development. The model illustrates the transfer of solar radiation from the beach surface through the sand profile and into heat stores at different depths. It considers properties of the substrate, such as moisture, compaction and conductance, and models how their interactions create a resistor to heat flow. The resistance component of the model explains heat flow and provides temperature at clutch depth. Clutch temperature at different embryonic stages helps to predict developmental transformations as growth, temperature-dependent sex determination and physiological death. A model of storage and transport of heat in sand can be used by biologists to predict potential detrimental impacts restoration activities such as beach nourishment projects, will have on a sea turtle nesting beach.

4:00 p.m. RES-8 The significance of the Indian River Lagoon as a juvenile foraging ground for the Western Atlantic Loggerhead turtle. J.S. REECE, L.M. EHRHART, and C.L. PARKINSON. U. Central Florida Dept. of Biology, 4000 Central Florida Blvd., Orlando, FL 2816-2368. Loggerhead sea turtles (*Caretta caretta*) recruit to juvenile feeding areas such as the Indian River Lagoon (IRL) at approximately 5-10 years of age. Genetic markers provide a basis for estimating the contributions of various nesting beaches to the juvenile population in the IRL. We have documented the presence of 6 previously described and 1 novel mtDNA haplotype in the IRL. A Bayesian based mixed-stock-analysis indicates that the IRL population consists of juvenile loggerheads from all of Florida with equal nesting beach contributions, and is thus an important feeding area for the entire Western Atlantic, as 80-90% of all nesting is located along the Florida coastline.

4:15 p.m. BUSINESS MEETING: FLORIDA COMMITTEE ON RARE AND ENDANGERED PLANTS AND ANIMALS
JACK STOUT, presiding

GEOLOGICAL AND HYDROLOGICAL SCIENCES

FRIDAY 9:00 a.m. – ENGINEERING BUILDING-1 327
GARY MADDOX, FL. DEPT. ENVIRONMENT. PROTECT., presiding

9:00 a.m. GHS-1 Defining springshed boundaries and water-quality domains near First-Magnitude Springs in North Florida. S.B. UPCHURCH, K.M. CHAMPION, J.C. SCHNIEDER (1), D. HORNSBY (2), R. CERYAK (2), and W. ZWANKA (2). (1) SDII Global Corp., Tampa, FL 33634, (2) Suwannee River Water Management District, Live Oak, FL 32060. Structural analysis and kriging were used to contour high-resolution water-level and water-quality data collected near Ichetucknee and Manatee-Fannin Springs. Results from the analysis suggest that the potentiometric surface of the Upper Floridan aquifer can be contoured with a high level of certainty when monitor wells are spaced within 5 - 10 miles of each other. Nitrate data can be contoured if monitor wells are spaced no further than 1 - 2 miles apart. Using a complete suite of chemical variables, several water-quality domains were also identified in the Ichetucknee Springs ground-water basin. The combined approach allows for more accurate springshed delineation and identification of spring influence zones.

9:15 a.m. GHS-2 Complex surface water-groundwater interactions associated with backwater conditions on the Withlacoochee River of north Florida. J.C. SCHNEIDER, S.B. UPCHURCH, and K.M. CHAMPION. SDII Global Corp., Tampa, FL 33634. The discharge of the Withlacoochee River and its associated springs is affected by backwater conditions resulting from downstream flow in the Suwannee River. For a given stage, discharge in the Withlacoochee River is higher while stage is increasing than during decreasing stage. The springs of the Withlacoochee River are estavelles that discharge into, or receive water from, the river depending on hydraulic conditions. Spring discharge is not only a function of aquifer head and river stage, but also the slope of the river surface, which is a function of the backwater conditions. For a given stage, the slope on the river is much greater during rising stage than during falling stage. This complex relationship is the focus of development of minimum levels and flows for the springs and river.

9:30 a.m. GHS-3 Doline and aquifer characteristics within Hernando, Pasco, and northern Hillsborough Counties. B ARMSTRONG (1), A COLLAZOS (2), J MALLAMS (1) and D. CHAN (1). (1) Geology, University of South Florida, Tampa, FL 33620, (2) Parsons Brinckerhoff, 5405 West Cypress St., Tampa, FL 33607. An investigation to examine the relationship between the spatial distribution of doline features and the hydraulic conductivity (K_x) of the underlying Upper Floridan aquifer was conducted in a 4,400 km^2 area of west-central Florida. Hydraulic properties of an aquifer are traditionally estimated from field tests and the values obtained are often more site-specific in nature than a regional characterization of the aquifer. Using depression data derived from U.S. Geological Survey (USGS) maps, doline densities (D_D) were calculated over the study area, and doline-area ratios (R_D) were generated and compiled by county, physiographic province, and model-derived K_x zones. Results from these analyses indicate that areas of high D_D coincide with northern portions of the study area where aquifer confinement is poor. Values of R_D calculated by county also support the observation of increased karst activity in the north. Establishing a relationship between karst geomorphology and the characteristics of the underlying aquifer could provide a useful technique for estimating regional-scale values of hydraulic conductivity or other hydraulic properties which could then be applied to a groundwater model.

9:45 a.m. GHS-4 Preliminary results of the evaluation of trends in the water quality of the springs of Florida. R.E. COPELAND. FL. Geol. Survey, Tallahassee, FL, 32304. Over 700 springs are used for recreational purposes by citizens of the state. Unfortunately, as a result of the burgeoning population, the quality of spring water has been deteriorating for the past several decades; most notably increased nitrate concentrations [NO3+NO2 (as N)]. Prior to the late 1980s, the monitoring of spring water quality was only conducted sporadically. However, because of the documented deterioration, several state agencies gradually began monitoring the spring water quality. By the 2003, several hundred Florida springs had been sampled at least once and nearly 75 are now being monitored on a regular basis. Historical data suggest springs can be clustered into four or five groups, based on water quality. In addition, analyzing greater than 10 years of data for time trends in approximately 75 springs suggests that saline indicators such as sodium, chloride, and sulfate may be the next analytes of concern for Florida's springs.

10:00 a.m. BREAK

10:15 GHS-5 Preliminary results of Fanning Springs Nitrate Contamination Study. T.H. GREENHALGH. FL. Geol. Survey, Tallahassee, FL, 32304. Fanning Springs is the centerpiece of Fanning Springs State Park which is located on the Suwannee River in Levy County Florida. This first magnitude spring discharges the highest concentration of nitrate-nitrogen of all of Florida's first magnitude springs. The spring consistently discharges water containing in excess of 3 mg/l nitrate-nitrogen with recent water quality samples approaching 6 mg/l. To date, a preliminary delineation of the springshed and the identification of nitrate sources have been completed. The collection of samples for isotopic age dating and an updated landuse coverage to model nutrient loading are currently underway. A determination of ground water travel times from identified sources and dilution rates prior to discharge at the spring are to be estimated when the study is completed. Animal waste and synthetic fertilizer have been identified as the potential major sources of nitrate-nitrogen in the springshed.

10:30 a.m. GH-6 The Florida Springs Initiative – the results of the Florida Geological Survey's three year investigation and the impacts on public policy. T.M. SCOTT and G.H. MEANS, Florida Geological Survey, 903 W. Tennessee St., Tallahassee, FL 32304. The Florida Springs Initiative, funded by the Florida Legislature since the 2001-02 fiscal year, was the result of the efforts of a diverse mix of geologists, biologists, other scientists and citizen representatives that comprised the Florida Springs Task Force. The Task Force was formed in response to the perception that Florida's springs were becoming degraded. The Florida Geological Survey was tasked with revising the Survey's 1977 bulletin "Springs of Florida" which included locations, descriptions and, in some cases, water-quality data. It is now known that more than 700 springs exist in the state. Survey teams visited, described and collected water samples at all the first magnitude springs (33) and approximately 60 second magnitude springs. The teams also visited other lower magnitude springs, inspecting and describing them. Nearly 500 springs have been described by the teams.

10:45 a.m. BUSINESS MEETING: GEOLOGICAL AND HYDROLOGICAL SCIENCES
GARY MADDOX, presiding

Geology/Hydrology Posters

POS-10 Surficial and bedrock geology of the eastern portion of the U.S.G.S 100,000 scale Marianna Quadrangle, Northwestern Florida. W.L EVANS, R.C GREEN, J.R. BRYAN and D.T PAUL. Florida Geological Survey, 903 W. Tennessee St., Tallahassee, FL 32304 The near surface geology of the eastern half of the U.S.G.S. 1:100,000 Scale Marianna Quadrangle, is composed of Eocene to Holocene carbonate and siliciclastic sediments. The geologic processes include a combination of fluvio-deltaic and marine deposition, erosion, dolomitization, and karstification. Several structural, sedimentological, and geomorphic variables are unique to the area and have affected the near surface expression and interpretation of the geology of the region. Two important structural features are recognized: the Chattahoochee Arch – a northeast/southwest-trending high that exposes Eocene and Oligocene carbonates, with younger strata thinning around the arch; and the Apalachicola Embayment/Gulf Trough - an elongated basin that noticeably influenced sedimentation patterns in the region.

MEDICAL SCIENCES

SATURDAY 8:00 a.m. ENGINEERING BUILDING-2 105
ALLEN SMITH, BARRY UNIVERSITY, presiding

8:00 a.m. MED-1 Effect of fixatives on the identifiablility of salivary sialomucin in the rhesus monkey. A. VAUGHAN and A.A. SMITH. Barry University, Miami Shores, FL 33161. It is generally believed that the choice of fixative affects neither the stainability of sialomucins in paraffin sections nor their susceptibility to neuraminidase digestion. We have found this to be true in sheep submandibular salivary gland, but not in rhesus monkey submandibular salivary gland. Fixing rhesus monkey submandibular salivary gland in Zenker's fluid leads to erratic results when the sections are exposed to neuraminidase digestion.

8:15 a.m. MED-2 Bronchial epithelial cell and submucosal gland secretions in asthma. J.P. COELHO (1), N. WILLIAMS (1), and A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL, 33161 and (2) Nova Southeastern University, College Of Medical Sciences, Ft. Lauderdale, FL 33328. Remodeling of airways is the hallmark of asthma. We examined paraffin embedded AB/PAS stained sections of asthmatic and non asthmatic bronchi. The airway areas of acidic, alcian blue, neutral, periodic acid-Schiff, and mixed positive staining was estimated. The asthmatics had more mucous AB positive cells overall. The AB/PAS positive prevalence was variable, ranging from dark blue to light magenta. The examined airways of asthmatics contained intraluminal debris and mucous plug. These findings suggest that, in fatal asthma, the morphologic remodeling of of the airway wall includes gland enlargement with altered mucus, a combination that likely contributes to the airway obstruction.

8:30 a.m. MED-3 Carbohydrate expression of the epithelial surface and the submucosal glands of asthmatic bronchi. M.D. CHUIDIAN (1), R.A. MIRZA (1), and A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL 33161, (2) Nova Southeastern University, College Of Medical Sciences, Ft. Lauderdale, FL 33328. We hypothesize that the inflammatory disease which results in asthma elicits change for both submucosal secretions and the glycocalyx carbohydrate expression. We examined asthmatic airways with biotinylated lectins that recognize target carbohydrates: α-D-GalNAc, β-Gal(1-3)-D-GalNAc, GSA1, L-fucose, N-Acetylglucosamine, Gal (β,1-4)-GluNAc, D-Mannose, D-Glucose, N-acetylneuraminic a., L-fucose , (α,2-3) galactosamine, and α-sialyl. Lectin binding was detected with the Vector Kit® ABC, avidin-biotin-HRP complex. RGB (red, green, blue) values were determined on digital images and compared by ANOVA. The micrographs depicted qualitative differences in glyco-conjugates of asthmatic bronchi.

8:45 a.m. MED-4 Carbohydrates in the bronchial mucosa of sheep. A.E. MOODY (1), A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL 33161, (2) Nova Southeastern University, College Of Medical Sciences, Ft. Lauderdale, FL 33328. We hypothesize that the attachment of microorganisms to the airway surface is based on the interaction of carbohydrates and lectins on the microorganisms and the airway secretions. We examined the carbohydrates with lectin probes that bind to carbohydrates: α-D-gal, α-D-galNac, β-D-gal, β-D-galNac, α-L-fuc, and α-sialyl were detected by Avidin-Biotin, Vector Kit®. Surface glycocalyx reacted with 4+ SBA & DBA and 2+ BSA. The bronchial secretory cells contained 4+ DBA, SBA, & UEA and 3+ BSA lectin reactivity. PNA, LPA lectins and DEL control were negative. The bronchial submucosal glands showed similar expression of carbohydrates. We conclude that the differential expression of carbohydrates may contribute to the pathogenesis of the microbial-host interaction.

9:00 a.m. MED-5 Characterization of carbohydrate expression in benign prostatic hyperplasia. D.P. HEATHERLY (1), B. JONES (2), and A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL 33161 and (2) Nova Southeastern University, College Of Medical Sciences, Ft. Lauderdale 33328. Prostate undergoes morphologic changes from normal to benign prostatic hypertrophy in most elderly males. We examined carbohydrate moieties of prostate tissue removed transurethrally for benign prostatic hypertrophy. We used the lectin probes for α-galNAc, α-gal, α-fuc, α-(2,3)-sialyl, α-(1,3)-man, β-galNAc, α-glcNAc, L-fuc, neu.a, and β-gal-(1,4)-gluNAc in histological sections. We found differential binding of lectins as detected with ABC/DAB. Our findings of specific carbohydrate alterations will be correlated with the currently used staging schema for prostatic changes.

9:15 a.m. BREAK

9:30 a.m. MED-6 Carbohydrate composition of corpora amylacea in prostatic hypertrophy and carcinoma. R.A. MIRZA (1), M.D. CHUIDIAN (1), B. JONES (2) and A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL 33161, (2) Nova Southeastern University, Ft. Lauderdale, FL 33328. As males age, the prostatic secretions within the prostatic ducts become calcified, laminated concretions termed corpora amylacea. The pathogenesis of the hypertrophy and neoplasia results in recognizable morphological changes. We hypothesize that their carbohydrate composition varies as well. Tissues were obtained from transurethral prostatectomies from patients with BPH and CA and examined histochemically for the relative abundance of concretions and their composition of neutral (magenta), acidic ab (dark blue), and mixed (purple) positively staining carbohydrate with ab/pas at ph 1.0 and 2.5. Results showed variably stained concretions in BPH; these were rare in CA. We conclude that the results may reflect lack of spatially differentiated glands in CA.

9:45 a.m. MED-7 Lectin histochemical assessment of poorly differentiated prostatic carcinoma: A.L. TANG (1), B. JONES (2), and A.T. MARIASSY (2). (1) Barry University, Miami Shores, FL 33161, and (2) NSU, College of Medical Sciences, Ft. Lauderdale, FL 33228. Prostatic carcinoma (PCA) is common in aged males, presenting a need for better diagnostic criteria. We hypothesize that PCA affects the carbohydrate content of prostate secretions. To detect sugar residues in PCA, we used lectins (agglutinins) that bind to the following carbohydrates: α-galNAc, a-gal, α-fuc, a-(2→3)sialyl, α-(1→3)-man, β-gal(1→3)-galNAc, a-glcNAc, L-fuc, neu a., b-gal-(1→4)-gluNAc in serial sections of formalin fixed, transurethal prostate resection tissues. Histochemistry detected carbohydrate expression in both epithelial and stromal components of the poorly differentiated PCA samples. The detected changes will be contrasted with the result of examined benign prostatic hyperplasia.

10:00 a.m. MED-8 Detection of *Mycobacterium avium* subsp. *paratuberculosis* DNA in blood from Crohn's disease patients. G. GHOBRIAL, G. MAHARAJA, and S.A. NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. Seventy EDTA-blood samples were collected from 35 subjects representing 18 CD patients and 17 non-CD controls. Using direct nested PCR, two different laboratories concurred in the detection of *M. avium* in 2 CD blood samples and none in the non-CD controls including Ulcerative Colitis (UC). By either center alone, *M. avium* DNA was detected in 4/18 (22%) of CD patients compared to 3/17 (18%) of non-CD controls. Of the three MAP-positive non-CD controls, two were from UC patients. Sequencing of amplified target DNA confirmed the presence of IS900 derived DNA sequence in tissue.. Following a few weeks of incubation, MAP was isolated by culture from 3/4 of CD samples that were positive by direct PCR. All non-CD samples remained negative by culture.

10:15 a.m. MED-9 Development of ELISA-based assay for diagnosis and treatment monitoring of inflammatory bowel disease. S. YANG, J. RUMSEY, and S.A. NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. The humoral immune response in Crohn's disease (CD) patients against *Mycobacterium avium* subsp *paratuberculosis* (MAP), a suspected cause of the disease, has been measured against two putative MAP recombinant antigens in an ELISA-based assay. Of 50 CD sera, 35 (70%) and 30 (60%) samples reacted with p35 and p36, respectively. Of 25 UC sera, 6 (24%) and 8 (32%) samples reacted with p35 and p36 respectively. Of 68 non-inflammatory bowel disease and healthy controls, only 25% and 18% were positive with p35 and p36 respectively. A combined p35 and p36 antigens mix has been used to test same sera samples. Consequently, only 25% of normal and NIBD sera were positive. The CD sera reactivity was slightly increased.

10:30 a.m. BREAK

10:45 a.m. MED-10 A functional approach for direct detection of *Mycobacterium avium* subsp. *paratuberculosis* DNA in Crohn's disease tissue. A. HAMDI, C. ROMERO, and S.A. NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. *Mycobacterium avium* subsp *paratuberculosis* (MAP) is a slow growing pathogen, which seems to play a key role in the pathogenesis of Crohn's disease (CD). This study examined the relationship at the molecular level. An FITC-labeled 20-mer *M. avium* specific oligonucleotide probe derived from the IS900 sequence was used in fluorescence *in situ* hybridization (FISH) on full thickness tissue. Of 21 surgical tissue specimens analyzed, 16 specimens were collected from 8 CD (inflamed and non-inflamed) and the remaining from non-CD patients. Processed slides were examined using confocal laser scanning microscopy (CLSM). The *M. avium* oligonucleotide was detected in 6/8 (75%) of CD patients compared to none in all 5 non-CD patients.

11:00 a.m. MED-11 Mycobacteria and Crohn's disease debate: it's all in the technique! G. GHOBRIAL and S.A. NASER Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. Difficulties encountered in isolation of *Mycobacterium* *avium* subsp *paratuberculosis* (MAP) from intestinal tissue obtained from Crohn's disease (CD) patients have lead to the controversial role of MAP in the disease etiology. Improved techniques for isolation of MAP were developed and used to investigate the presence of MAP in surgical tissue obtained from CD patients. Fifty-two tissue and lymph nodes specimens from 16 CD patients and 12 non-CD controls were collected at the time of surgery. Tissue sections were analyzed directly by nested PCR using IS900 derived oligonucleotide primers followed by sequencing of amplified products. Other tissue sections were homogenized, decontaminate and then inoculated into Bactec and MGIT culture media. Using direct nested PCR, MAP DNA was present in an overall of 14/16 (88%) of CD patients compared to 5/12 (42%) of non-CD controls.

11:15 a.m. MED-12 Role of PMN's, MNC's and mycobacteria in Crohn's disease pathogenesis. C. ROMERO and S.A. NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. The state of the cellular immune response and the role of *M. avium* in CD were evaluated. Fresh EDTA-blood samples were obtained from 28 subjects (15 CD, 7 Non-CD and 6 healthy controls). The *in vitro* phagocytosis assay has been performed on purified PMN's and MNC's exposed to fluorescein-isothiocyanate (FITC)-labeled *M. avium*. Following *in vitro* phagocytosis, 11/15 (73%) of CD samples indicated defect in PMN's compared to 3/7 (43%) of non-CD and none (0/7) of healthy controls. MNC's proliferation assay may be utilized as a valuable marker in the evaluation of the MAP role in CD etiology.

11:30 a.m. MED-13 Cellular infiltration and cytokine expression profiling in Crohn's disease tissue. C. ROMERO and S.A. NASER. Department of Molecular Biology and Microbiology,University of Central Florida, Orlando, FL 32816. Tissue samples from 13 subjects (8 CD and 5 non-CD) were obtained at the time of surgery. Sections were cut and analyzed using specific monoclonal antibodies and Oregon green 488 goat antimouse IgG-FITC labeled conjugate followed by Confocal Scanning Laser Microscopy. IL-12 and TNF-alpha cytokines expression was significantly increased in both CD groups (inflamed vs non-inflamed) compared to non-CD. Similarly the expression of tissue dentritic macrophages was significantly increased in the inflamed CD tissue compared to the non-CD, but it was not significantly different when compared to non-inflamed CD tissue. Surprisingly, the expression of the T-helper (CD4) subset was significantly decreased in the CD inflamed tissue compared to the non-inflamed tissue and non-CD samples. Furthermore, cytokines overexpression correlated directly to the fistulizing state in CD

11:45 a.m. MED-14 Occurrence of posttranslational modification in *Mycobacterium smegmatis.* M. SAFAVI-KHASRAGHI and S.A. NASER. Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. *Mycobacterium smegmatis* has been studied as a potential cloning system that may aid in posttranslational modification. A 6.384 kb chimeric shuttle phagemid vector pNEZ6.3 that contains the origin of replication of pBR322, the origin of replication of pAL5000, the f1 origin for rescue ssDNA, the T7 and Sp6 bacteriophage promoters, a kanamycin resistance gene and two multiple cloning sites was used for cloning a 19 kDa encoding gene from *M. avium* subsp *paratuberculosis.* The native *M. avium* 19 kDa protein lacks a 2 kDa component when expressed in *E. coli* system which was restored when cloned in a homologous host like *M. smegmatis.*

12:00 p.m. BREAK

1:00 p.m. MED-15 Differential uptake of fluorescent polyamine conjugates in A375 melanoma cells. H. CARIAS and O. PHANSTIEL. Dept. of Chemistry, Univ. of Central Florida, Orlando, FL 32816. The polyamine transporter (PAT) provides a means for rapidly-proliferating cells to internalize exogenous polyamines necessary for growth. A cytotoxic fluorescent marker, anthracene, was conjugated to a series of polyamine vectors. The uptake of 10 μM solutions of each conjugate into A375 cells was monitored by fluorescence microscopy to relate molecular structure to PAT mediated uptake. The conjugate with the longest polyamine sequence (e.g., Ant-4,4,4-tetraamine conjugate) was found to localize primarily around the cell membrane of detached cells and not within the cell; whereas the other compounds tested showed a greater degree of internalization in detached cells. These differences were not evident in attached cells; wherein all the conjugates appeared to be internalized to the same extent.

1:15 p.m. MED-16 Coccidial colonization of the cecum in the *Eimeria* infected partridge. M. DUROJAIYE (1), V. LETKOVA (2), M. GOLDOVA (2), A.T. MARIASSY (3). (1) Barry University, Miami Shores, FL, 33161, (2) University of Veterinary Medicine, Kosice, Slovakia, and (3) Nova Southeastern University, College Of Medical Sciences, Ft. Lauderdale 33328. Coccidia cause specific patterns of intestinal lesions that vary with the coccidium and host species. Experimentally infected partridge chicks were examined at day 1 through day 6 post infection. Differential counts of parasitic forms were made in H&E sections. Average counts ranged from 0 to 1000 of the 1st, 2nd, and 3rd generations of schizonts and 0 to 575 gametocytes per cecal section. A significant double wave of re-infection was observed as indicated by the fluctuation from 525 to 14 to 391 gametocytes at days 4, 6, and 12. These results support the qualitative observation that coccidia colonize cecum in a progressively intensive fashion unequally.

1:30 p.m. MED-17 Cross-reactivity of bahia (*Paspalum notatum*) and timothy (*Phelum pratense*) grass pollens. J.M WHITE, L. MESCAVAGE, S. NASER, M. J SWEENEY, G. GHOBRIAL, and R.S WHITE. University of Central Florida, Orlando, FL 32816. Timothy grass and bahia grass pollens share common epitopes. A 32 kD protein allergen of bahia has been recently shown to share 63% homology with a Group I timothy grass pollen allergen. Protein extracts of bahia grass pollen, timothy grass pollen, and a tree pollen control were evaluated for their ability to bind to IG 12, a monoclonal antibody directed against Group I timothy allergens and AF 6, a monoclonal antibody directed against Group XIII timothy allergens using Western blotting. The group I monoclonal reacted with timothy crude extract pollens and with a number of proteins in bahia extracts. The group XIII monoclonal reacted with a 55kD protein of timothy and a bahia protein of similar molecular weight. The monoclonal antibody made to group V allergen of timothy failed to react with the bahia allergens.

1:45 p.m. MED-18 Differential behavior of fiber types in fast and slow twitch muscles following denervation. S. RICHARDSON and S. SESODIA. SGMS, Barry University, 11300 NE 2nd Avenue, Miami Shores, FL 33161. Denervation leads to significant skeletal muscle fiber atrophy. However, the question of whether muscle fibers respond to denervation similarly in different types of muscles is still unresolved. In FAS 2003 we presented data on two muscles (soleus [SOL] and tibialis anterior [TA]) examining this question. We reported that in the fast twitch muscle, TA, type 1 fibers appeared to hypertrophy in contrast to the atrophy seen in these fibers in the SOL. However, the type 1 fiber data was from a small sample size and could not be tested statistically. The type 2 fibers atrophied in both muscles. We have extended and augmented our investigation into the response of the type 1 fibers and also comment on the change in the proportion of fibers following denervation.

2:00 p.m. MED-19 Endocytosis and pH signaling in *Aspergillus nidulans*. E. GRAHAM, J. WILLIAMS, and S.H. DENISON. Natural Sciences/Biology, Eckerd College, St. Petersburg, FL 33704. Regulation of gene expression by ambient pH in the filamentous fungus, *Aspergillus nidulans* is mediated by a signaling pathway composed of the products of the *palA, B, C F, H,* and *I* genes and the PacC zinc-finger transcription factor. This pH regulatory system ensures that extracellular enzymes (as well as permeases and exported metabolites) are produced under conditions of pH where they can function:. The *palI* protein is a plasma membrane protein that is transported to vacuoles in response to alkaline pH, the signal which activates the signaling pathway. *PalI* may, therefore, be the pH receptor in the pathway, and pH signaling may involve endocytosis of the receptor.

2:15 p.m. BUSINESS MEETING: MEDICAL SCIENCES
ALLEN SMITH, presiding

JOINT MEETING
PHYSICS AND SPACE SCIENCES SECTION
ENGINEERING SCIENCES SECTION

FRIDAY 10:00 a.m. – ENGINEERING BUILDING-1 427
SESSION A
HAMID RASSOUL, FLORIDA INSTITUTE OF TECH., presiding

10:00 a.m. PSS-1 Calibration of analog sensors for the alignment of muon chambers in the CMS experiment. M. RIPERT, L. CARAWAY, and M. HOHLMANN. Florida Inst. of Tech., 150 W. University Blvd. Melbourne, FL 32901. We have developed a semi-automated bench for the calibration of various types of analog position sensors, such as wire-extension and linear-motion potentiometers, and optical photomicrosensors. These sensors will monitor the movement of CMS muon chambers for the purpose of alignment and will be used for critical corrections in the reconstruction of muon tracks. We will discuss our Labview-based control and readout system, calibration procedures, and first calibration results.

10:15 a.m. PSS-2 Calibration of clinometers for the alignment of muon chambers in the CMS experiment. T. MOSCHOUTIS, M. RIPERT, L. CARAWAY, and M. HOHLMANN. Florida Institute of Technology, Melbourne, FL 32901. The CMS experiment at the Large Hadron Collider requires continuous monitoring of the position and inclination of large muon chambers. The goal of our development effort is to come up with an automated calibration procedure for a clinometer that measures angles electronically and is part of the monitor system. As a first step, we have constructed a mechanism that tilts the sensor by a known angle. The signal produced by the clinometer is readout by a computer using LabView, which will convert it into an angle value. The reference angle and the one found by the computer are compared in order to measure the reliability of the clinometer and to calibrate it. The presentation will focus on the details of the design and the results of these calibration procedures.

10:30 am. PSS-3 Simulation of the CMS endcap muon alignment scheme using COCOA. S. WALKER and M. HOHLMANN. Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. In the mounting of the iron yokes on the Muon Endcap of the CMS experiment, dowel pin holes, which are machined to the discs, should provide a local accuracy of at least 2mm for every Cathode Strip Chamber (CSC). The CMS Object Orientated Code for Optical Alignment (COCOA) has been used to simulate optical components of a position monitoring system for these chambers. A continuation of these studies will provide more data on the alignment of the CSC chambers through the simulation of both the optical and analog sensors. Simulations of the analog sensors will be run and the data compared to physical measurements. The goal is to gain greater accuracy in measuring the positions of the CSC chambers. The most stringent requirement imposed on the knowledge of chamber locations is about 200 μm. This is due to the fact that the large amount of tracker material in the CMS detector causes multiple scattering of muons and therefore imposes a limit of 200 μm on the determination of a muon track.

10:45 a.m. PSS-4 Simulation of aging phenomena in gaseous particle detectors. J. JANNEY, J. BRENNER, K. DEHMELT, E. DSHALALOW, M. GIBSON, M. HOHLMANN, and D. WOLFMUELLER, Departments of Chemistry, Mathematics, Physics & Space Sciences, Florida Inst. of Tech., Melbourne, FL 32901. Aging phenomena affect the efficiency of gaseous detectors through various chemical reactions occurring within the detector gases. Up to 30 different physical and chemical processes need to be modeled, e.g. electron diffusion, polymer ablation, or the addition of gas phase species to polymers. The goal is to understand the interplay of these processes in detail to find means of avoiding aging effects and prolonging the useful lifetime of these particle detectors. First results of a simulation starting from the GARFIELD program package will be discussed.

11:00 a.m. BREAK

11:15 a.m. PSS-5 Prototypes for particle detectors employing gas electron multiplier. J. SLANKER, G. KARAGIORGI, K. DEHMELT, M.HOHLMANN and L. CARAWAY. Florida Institute of Technology, Dept. of Physics and Space Sciences, Melbourne, FL 32901. Single and Triple Gas Electron Multiplier (GEM) Detectors have been designed and built in the Detector Development Lab at Florida Tech. The detectors comprise one or three GEM foils sandwiched between a drift plate and an induction plate. The GEM foils are perforated 50 μm thick sheets of kapton covered on both sides with copper. The micro-holes in the GEM foil cause secondary electrons, from high-energy particle interactions in the gas volume, to cascade through the gaseous environment. The electrons drift towards the induction plate, where a signal pulse is picked up. Design, set-up and preliminary results on performance will be presented.

11:30 a.m. PSS-6 Measurement of the photon structure function $F_2^\gamma(x,Q^2)$ with the LUMI detector at L3. G. BAKSAY and M. HOHLMANN. Florida Tech, Dept. of Phys. and Space Sci., 150 West University Blvd., Melbourne, FL 32901. One possible description of the photon is given by the photon structure function $F_2^\gamma(x,Q^2)$ obtained from deep inelastic electron-photon scattering at the LEP e^+e^- collider at CERN. Single tag events are selected from data taken with the L3 detector at the center-of-mass energies of 189-206 GeV and integrated luminosity of 584 pb^{-1}. Since the energy of the target photon is not known the kinematics has to be determined from the final state hadrons, which are partially observed by the detector. This leads to a dependence of the F_2^γ measurement on Monte Carlo modeling of the hadronic final state. From the measured cross section the extraction of F_2^γ / α is possible. The study of its evolution with Bjorken x and virtuality Q^2 (in the LUMI range) allows important tests of QED and QCD predictions and provides a better understanding of the structure of the photon.

11:45 a.m. PSS-7 Single tagged 2γ events with the electromagnetic detectors of L3. L. BAKSAY, K. DEHMELT, and M. HOHLMANN. Dept. of Physics and Space Sciences, Florida Institute of Technology, Melbourne, Fl 32901. In order to extend the investigation of the Q^2 evolution of the hadronic structure function F_2^γ with L3, to Q^2 as low as $0.5 GeV^2$ and as high as $3850 GeV^2$, we will include the electromagnetic calorimeters (BGO), active lead rings (ALR), and the very small angle tagging detectors (VSAT) as tagging devices for single tagged 2γ events. Strategies for selecting events with these detector components will be presented.

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-1 427
SESSION B
AL HALL, CITY OF TALLAHASSEE, presiding

2:00 p.m. PSS-8 Elemental and isotopic composition of Galactic Cosmic Rays. A. FARAHAT (1), M. ZHANG (1), H. RASSOUL (1), AND

J. CONNELL (2). (1) Dept. of Physics and Space Sciences, Florida Institute of Technology, Melbourne, FL 32901. (2) The University of New Hampshire, Durham, NH, 03824. The composition of galactic cosmic rays differs from the galactic and the solar system compositions. This is because high energy cosmic rays nuclei interact with interstellar gas and produce secondary cosmic ray nuclei that are normally much less abundant in the average material of our galaxy or the solar system. Cosmic ray propagation in the galaxy is the key to understand the cosmic ray composition. In this study we are utilizing the Markov stochastic processes to the computation of cosmic ray propagation through 3-dimensional galactic magnetic fields and interstellar medium. We have examined the cosmic ray propagation path from their source to our solar system and what occur to the path length of these particles when it passes through the local bubble at the edge of our solar system or the high-density gas clouds in the interstellar space. The current results of this investigation will be presented, and the ongoing efforts to include the average galactic magnetic field structure to allow for different diffusion coefficients, parallel and perpendicular to the field, will be discussed.

2:15 p.m. PSS-9 Measurements of Cosmic Ray Muon Flux and Muon Lifetime Using Scintillation Detectors. G. KARAGIORGI, J. SLANKER and M. HOHLMANN. Florida Tech, Dept. of Physics and Space Sciences, Melbourne, FL 32901. Muons are created in the upper atmosphere of the Earth by cosmic rays, which are mostly protons that come from outer space. When a high-energy proton hits one of the nuclei of the atmospheric gas molecules, it creates an "air shower." In an air shower, different subatomic particles are created, including pions, which then decay into muons. These highly energetic muons interact only weakly with the air and have a mean lifetime long enough for some to arrive at the Earth's surface, where they can be detected. Using a setup of two scintillation detectors, flux, count rate, and energy variation of muons originating from cosmic ray air showers have been investigated; the factors considered were the amount of material muons travel through, zenith angle, North-South vs. East-West orientation, and setup configuration of the detection system (overlap area and separation distance). Also, the method of detection allowed for verification of the theoretical value for the muon lifetime, and study of cosmic ray air showers.

2:30 p.m. PSS-10 Variation of elemental abundances in the solar corona as inferred from ACE and WIND measurements of solar energetic particles. M. AL-DAYEH, J. DWYER, and H. RASSOUL. Florida Institute of Technology, Dept. of Physics and Space Sciences, Melbourne., FL, 32901. Solar energetic particles (SEPs) can be used to probe the composition of the solar corona, independent of spectroscopic or solar wind measurements. However, previous studies have shown that SEPs elemental abundances in large gradual events can vary considerably (by factors of >10) from event to event, which must be taken into account when using SEP measurements to deduce the coronal composition. Unfortunately, the causes of these variations are still not known, and may be produced either by acceleration/transport effects or variations in the source abundances, the later of which might be expected to show up as the solar cycle dependence in abundance ratios. Using the Ultra Low Energy Isotope Spectrometer (ULEIS) onboard the Advanced Composition Explorer (ACE) and the STEP instruments onboard the WIND spacecraft, we have measured the fluxes of the iron (Fe) and the averaged C-N-O at high and low energies ranging between 0.02-2 MeV/nucleon. In this study, we report measurements of the compositional changes for 30 gradual events between 1994 and 2003. Although our preliminary analysis of these events reveal that the Fe to C-N-O ratios vary drastically from event to event, no dependence has been found on the solar cycle.

2:45 p.m. PSS-11 Empirical study of resonant eigenfrequency and peak power of earth's inner magnetosphere using MEASURE array. G. KESHISHIAN (1), H. RASSOUL (1), M. MOLDWIN (2), D. BERUBE (2), and M. AL-DAYEH (1). (1) Dept. of Physics and Space Sciences, Florida Institute of Technology, Melbourne., FL, 32901. (2) Department of Earth and Space Sciences, University of California, Los Angeles, Los Angeles, California. The Magnetometers Along the Eastern Atlantic Seaboard for Undergraduate Research and Education (MEASURE) array were deployed in 1998 and it runs from low to mid-latitudes ($1.74 < L < 3.12$) along the east coast of the United State. In this study, the resonant eigenfrequency and frequency of the peak power in the inner magnetosphere of the earth were determined using this dataset. The 3 months of January, August, and September of the years 2000 were analyzed for a correlation investigation between the magnetic field resonant eigenfrequency and various magnetospheric pulsations. Furthermore, quantified values of narrowband and broadband power were evaluated and their relations to the eigenfrequency were investigated.

3:00 p.m. BREAK

3:15 p.m. PSS-12 System concepts and definitions. R.P. HAVILAND. Minilab Instruments, Daytona Beach, FL 32119. Reviews present lack of a rigorous definition of the term, System. Shows the creation of an elementary system by combination of objects which possess (in a pure sense) no system properties, inductance and capacitance being examples. Shows that new quantities can appear, specifically LC and L/C in this case, which are so useful that names are assigned to them. Defines these as system variables. Defines a system as an entity formed when new quantities appear on appropriate interconnection of basic objects. Shows analogs such as mass plus spring, leading to definition of domains. Reviews assemblies of systems, showing that the creation of new variables is a requirement for creation of new systems. Introduces the concept of system levels, a term implied by the common term sub-system. Notes that very high level systems become self-directing and self-sustaining, due to presence of internal decisions.

3:30 p.m. BUSINESS MEETING: JOINT SECTIONS - PHYSICS AND SPACE SCIENCES & ENGINEERING SCIENCES
AL HALL & HAMID RASSOUL, presiding

SCIENCE TEACHING

FRIDAY 9:00 a.m. – ENGINEERING BUILDING-2 105
ROBIN JORDAN, FLORIDA ATLANTIC UNIVERSITY, presiding

9:00 a.m. TCH-1 Using an electronic response system in the classroom: part I. R.G. JORDAN (1), J.E. HAKY (2) and C. CONWAY (2). (1) Department of Physics, (2) Department of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton, FL 33431. The Class Performance System (CPS) produced by *eInstruction* is an interactive system that enables instructors to pose questions to a class and get individual responses from students, via hand-held keypads, that are graded automatically and logged into a class grade-book. In this talk we will outline the many advantages to both the student and the instructor compared with more traditional approaches of questioning-answering in class.

9:15 a.m. TCH-2 Using an electronic response system in the classroom: part II. J.E. HAKY (2), R.G. JORDAN (1) and C. CONWAY (2). (1) Department of Physics, (2) Department of Chemistry and Biochemistry, Florida Atlantic University, Boca Raton, FL 33431. In this talk, we will give a demonstration of the Class Performance System that we are using currently in introductory Chemistry and Physics courses. We will show a number of examples of the types of questions, and follow-up questions, that allow us to investigate critically such things as pre-conceptions, misconceptions and depth of understanding of the course material and core concepts.

9:30 a.m. TCH-3 Crosswinds in Science for the 21st Century: Darwinism, Creationism, and Intelligent Design. D.W. LOVEJOY. Palm Beach Atlantic University, West Palm Beach, FL 33416. Several theories of origin concerning evolution and the concept of the "tree of life" now compete with Darwinism for attention in the science teacher's presentations. Classical Darwinism was proposed by Charles Darwin in 1859, but has now been modified by concepts such as Punctuated Evolution. Young Earth Creation Science (proposed by Henry M. Morris in 1961) and the Intelligent Design Movement (begun by Phillip Johnson in 1991) are more recent proposals. A review of all three theories will be presented, focusing on their proponents, the seminal texts, present-day sponsoring institutions, basic tenets and assumptions, views about the age of the Earth, religious overtones if any, the degree of scientific acceptance, and any evidence that either tends to support or be in opposition to the theories.

9:45 a.m. BREAK

10:00 a.m. TCH-4 Use of Cooperative Learning Groups in General Chemistry Laboratory Courses at HCC, Brandon Campus. E. PEREZ. HCC, Brandon Campus, Tampa, FL 33619. Cooperative Learning Groups (CLP) is the instructional use of small groups so that students work together to maximize their own and other's learning. The idea is simple: class members are organized into small groups after receiving instruction from the teacher. They then work through the assignment until all group members successfully understand and complete it. A positive interdependence is developed, while maintaining individual accountability. Participants strive for mutual benefits; all group members share a common fate. There is a sense of pride and joint celebration when goals are achieved. HCC Brandon implemented the use of CLP in several General Chemistry Laboratories in the Fall of 2003. Students applied the scientific method in a guided-inquiry approach within the CLP environment. A control section ran in the traditional laboratory environment. A two-semester study is underway to determine if this new approach to laboratory teaching enhances the learning process. Present results will be shared as well as the personal challenges and joys of implementing CLP.

10:15 a.m. TCH-5 Teaching college lab science to non-scientists. G. ELLIS, D. MOLNAR and J.R. MONTAGUE. SNHS-Biology, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161. We examined pre-course and post-course knowledge of and attitudes toward science and what scientists do among non-science majors enrolled in specially designed lab courses at a private Catholic university in 2003. These courses were designed to expose non-science majors to the scientific method both in theory and in hands-on application. The courses included offerings in Biology of Women, Biology of Crime, the Six Senses, and Sustainable Ecology. The non-science students tended to enter the courses with surprisingly high levels of affective development (values and feelings about science) according to Bloom's taxonomy. However, the students showed relatively low levels of cognitive understanding (ability to make accurate statements about science and what scientists do). We infer students entered the courses thinking mainly in deductive fashion, believing that scientists make a positive contribution but knowing little about how scientists actually work. In addition pre-course and post-course measures of the students' science self-efficacy (competence and confidence) were taken. Results indicated that students' science self-efficacy grew during the course of the semester. (Supported by National Science Foundation Curriculum Development and Planning Grant awarded to Gilbert Ellis, NSF proposal 0310574).

10:30 a.m. TCH-6 A model laboratory exercise to teach research methodologies to non-science majors. G.E. ELLIS, A. SILER-KNOGL, I. REYES, S. GAYMONT and J. DABDOUB. Barry University, Miami Shores, FL 33161. Through the use of a live animal research project non-science majors observed altered nutritional effects on groups of Charles River Breeding Laboratory CD-1 strain albino mice. The students worked in six (6) groups of four (4) and caged four (4) male or female mice during a thirty (30) day experimental time period. During the first week all animals were maintained on a control diet and their body weights were recorded every two to three days. After the first week experimental diets were implemented to demonstrate characteristic changes in growth and development. Dietary changes involved altering the carbohydrate, protein, lipid and Kcal intake to determine what effects they produced in growth during the experimental phase. A low protein diet was used to mimic the condition of Kwashiorkor. At the end of a two week experimental diet all animals were placed back on the control diet to observe recovery. Measurements of change in weight were related to dietary intake parameters and the students analyzed the collected data to determine what effects dietary intake had on growth and development within the population of the CD-1 mice. (Supported by National Science Foundation Curriculum Development and Planning Grant awarded to Gilbert Ellis, NSF proposal 0310574).

10:45 a.m. TCH-7 Mid-semester grades: what do the tell us? J.R. MONTAGUE and E.T. HAYS. SNHS-Biology, Barry University 11300 NE 2nd Avenue, Miami Shores, FL 33161. We examined the recent performance of 75 pre-med undergraduates in a zoology course (Fall 2003); these were mainly 2nd-year majors with at least one semester of college biology coursework already completed. Quantitative variables (cumulative college GPA entering the 2nd year, mid-semester and final zoology course averages) were used in regression analysis to find appropriate predictors for success in the 2nd year of pre-med studies. Entering cumulative college GPA < 2.75 was a statistically reliable warning sign of trouble at the start of the 2nd year of pre-med studies. We also found that 75% of the statistical variability in final semester zoology average was explained by mid-semester average, while the remaining 25% was unexplained (*e.g.*, factors such as personal health, motivation, maturity, *etc.*, may be involved).

11:00 a.m. TCH-8 Using computer simulations to enhance teaching. N. PAPANEARCHOU and T.H. LEVENTOURI. Department of Physics, Florida Atlantic University, Boca Raton, FL 33431. We discuss computer programs for designing and analyzing the structure of several types of materials at the atomic level. We begin with simple examples of structure addressed to high school-level students using the ATOMS program. We continue with the program for phase identification from x-ray powder diffraction data and then we go to the graduate and post-graduate levels to discuss crystal structure analysis by using computer programs based on the Rietveld refinement method.

11:15 a.m. TCH-9 The Marine Lab Outreach Program: designing an interactive, problem-based program for multi-generational users. E. NEMCHONOK, M. JOURDAN, C. BENO, and S. GILCHRIST. Natural Sciences, New College of Florida, Sarasota, FL 34243. Edutainment, combining educational activities with entertainment, has become common at theme parks and in museums. However, it is difficult to assess how much educational value is retained by clients of different ages and backgrounds. The MLOP team researched group dynamics, learning styles, tests and measurements, as well as specific scientific information about marine topics to prepare interactive exhibits and hands-on activities for a pilot group of participants. Feedback on the pilot program showed that pairing thematic interactive and informational activities was effective.

11:30 p.m. BUSINESS MEETING: SCIENCE TEACHING
ROBIN JORDAN, presiding

SOCIAL SCIENCE

FRIDAY 2:00 p.m. – ENGINEERING BUILDING-2 103
MARIBETH DURST, SAINT LEO UNIVERSITY, presiding

2:00 p.m. SOC-1 Exploring supervisor behaviors and coping strategies as moderators of employee burnout. P. DUQUE and M. TEJEDA. Barry University, Miami Shores, FL 33161. Work stress and burnout are common concerns among organizations, as they both have effects on the productivity of the workers. The proposed study will examine the quality of relationship between supervisor and employee and its effect on employee burnout. In addition, various coping strategies used by employees and its effects on employee burnout will also be examined. One hundred Master of Science nursing students will complete a work stress measure, a social support measure (House, 1981), a coping measure (Carver, Scheier & Weintraub, 1989), a leader-member exchange measure (Scandura & Graen, 1986), and a burnout measure (Meier, 1983). It is hypothesized that high levels of work stress will more likely predict employee burnout. Secondly, a high quality leader-member exchange (LMX) relationship will be negatively correlated with employee burnout. Likewise, a low quality LMX relationship will be positively correlated with employee burnout. In addition, there will be a negative correlation between coping strategies and employee burnout.

2:15 p.m. SOC-2 Event-related potential correlates of the big five. E. DRAKE, G. STARRATT, and C. STARRATT. Dept. of Psychology, Barry University, Miami Shores, FL 33161. Up to this point, investigators who have endeavored to find a relationship between personality characteristics and electrophysiological measures have focused on the trait of extraversion. The present study extends this research by examining the relationship between event-related potential (ERP) brain responses and all of the Big Five personality factors: neuroticism, extraversion, openness, agreeableness and conscientiousness using an auditory oddball paradigm. Student participants completed the NEO Personality Inventory and ERPs were elicited using an auditory oddball paradigm. Results indicate that personality traits are differentially reflected by electrophysiological measures of attention.

2:30 p.m. SOC-3 Alexithymia and the P3 component of the event-related potential. E. LOPEZ, Y. STAHL, C. BERGER, G. STARRATT, and C. STARRATT. Dept. of Psychology, Barry University, Miami Shores, FL 33161. The P3 component of the event-related potential (ERP) is associated with cognitive processes as well as subjective factors and has also been used to investigate the physiological correlates associated with psychological constructs such as personality and emotion. ERP methodology was used to investigate the electrophysiological nature of alexithymia, a condition characterized by the inability to describe, differentiate, and/or express one's feelings. Student participants were identified as relatively high or low in alexithymia using the Toronto Alexithymia Scale (TAS-20, 1993) and ERPs were elicited in an attend condition using an auditory oddball task. The amplitude of the P300 component of the ERP was measured. Hemispheric asymmetries associated with alexithymic characteristics were noted. Results from this study provide insight into the physiological nature of alexithymia.

2:45 p.m. SOC-4 Alexithymia and the mismatch negativity (MMN) component of the vent-related potential (ERP). S. CHADEE, G. TURBOK, G. ABRAMS, G. STARRATT, and C. STARRATT. Dept. of Psychology, Barry University, Miami Shores, FL 33161. MMN is apparent in the brain's differential response to standard and deviant stimuli presented in an auditory oddball paradigm. As a change-detector response, MMN provides an index of the additional processing elicited by deviant as compared to standard stimuli. Student participants were identified as relatively high or low in alexithymia using the Toronto Alexithymia Scale (TAS-20, 1993) and ERPs were elicited to ignored stimuli. Results suggest that individuals who are less able to identify and label their own emotional state show reduced frontal processing of even affectively neutral auditory stimuli, as compared to those who are more skilled. This raises questions regarding the role of the frontal lobes in the processing of all types of external stimuli--not only affectively valenced stimuli--as it relates to the cognitive processing of subjective affective states.

3:00 p.m. BREAK

3:15 p.m. SOC-5 Stigmatized sources and persuasion: race as a determinant of argument scrutiny. N. JONES and J. RODRIGUEZ. Dept. of Psychology, Barry University, Miami Shores, FL 33161. The study examined the effect that race would have on the processing of persuasive messages coming from a member of the same ethnic group. A total of 90 White-Cuban students from a university in South Florida participated in the study. Students were randomly assigned to a 2 (argument quality: strong or weak) x 3 (race of source: White, White-Cuban, or Black-Cuban) factorial design. When evaluating the quality of an argument in favor of senior comprehensive exams, White-Cuban participants had a more favorable attitude when the source of the message was a White-Cuban than when the source of the message was a Black-Cuban. Findings suggest that for White-

Cubans, race may trump ethnicity when evaluating persuasive messages from members of their supposed in-group (e.g. Black-Cubans).

3:30 p.m. SOC-6 Gender differences in motivation for alcohol consumption among college students. B. LOTT and D. JONES. Dept. of Psychology, Barry University, Miami Shores, FL 33161. This study sought to determine gender differences in motivation (social and coping) to consume alcohol. It was hypothesized that men and women would differ in the quantity of alcohol consumed and in their motivation for alcohol consumption, and that men would be more likely to be identified as potential alcoholics. Participants were 64 students (22 men, 42 women) who rated motivation for alcohol consumption and completed the CAGE and MAST. Results indicated men were significantly more likely to use alcohol as a coping strategy, to consume alcohol more frequently and in greater quantities than women, and to have a higher probability to develop problematic drinking. Women reported both social and coping motivations for alcohol consumption. Results underscore the importance of intervention programs targeting coping strategies for college students as alternatives to alcohol use.

3:45 p.m. SOC-7 100 years of change: U.S. county population patterns 1900-2000, Part 2. R. SCHULTZ, E. HENNING, B. ANYZESKI, and M. BROKER. Department of Geography and Geology, Florida Atlantic Univ., Boca Raton, FL 33431. Cartographic display and statistical associations of socio-economic and demographic characteristics of U.S. counties over the past century. The ‘emptying-out’ of the U.S. heartland, the growth of the periphery, the concentration of the elderly, and other broad socio-economic and demographic spatial patterns and their associations are identified and examined. Causal hypotheses are tested and future trends suggested.

4:00 p.m. SOC-8 The relationship between traditional mask categories and coping with specific life events as observed within an art therapy research context. S.J. SMELLIE. Barry University, Miami Shores, FL 33161. This study of masks made by 60 adult participants in art therapy research explores the feasibility of classifying masks using traditional categories of Concealment, Revealment, and Transformation. It is predicted that Revealment masks, reported rarely in the worldwide literature of *in vivo* masks, will not be uncommon within an art therapy setting. Participants will select a negative life event then report how they coped with that event using the COPE (Carver, Scheier, & Weintraub, 1989) before making a mask and responding to two original mask questionnaires. Negative correlations are predicted between Acceptance and Concealment masks and between Mental Disengagement/ Denial and Transformation masks. Positive correlations are predicted between Active Coping and Revealment masks.

4:15 p.m. SOC-9 Differences in aggression found in boys and girl's dreams. G. SPAZIANO. Dept. of Psychology, Barry University, Miami Shores, FL 33161. Aggression was analyzed in 271 dream accounts provided by a pre-school teacher, collected from 1976 to 2000. The children are ages 4-5, 159 dream accounts are from males and 112 dream accounts are from females. The amount of aggression was determined by the number of "aggressive" verbs found throughout the accounts of the dreams. In order to identify these specific verbs, one must consider the context of the dream, along with the intent of the dreamer. The results indicated that the boys showed a significantly larger amount of aggression in their dreams than the girls. Although these findings were consistent with the original hypothesis, there was not a significant difference in the length of the dreams between these two groups. Also, this study revealed that even though the boys proved to be more aggressive in their dreams than the girls, overall, there was a significantly low amount of aggression found throughout the dreams.

4:30 p.m. BUSINESS MEETING: SOCIAL SCIENCE
MARIBETH DURST, presiding

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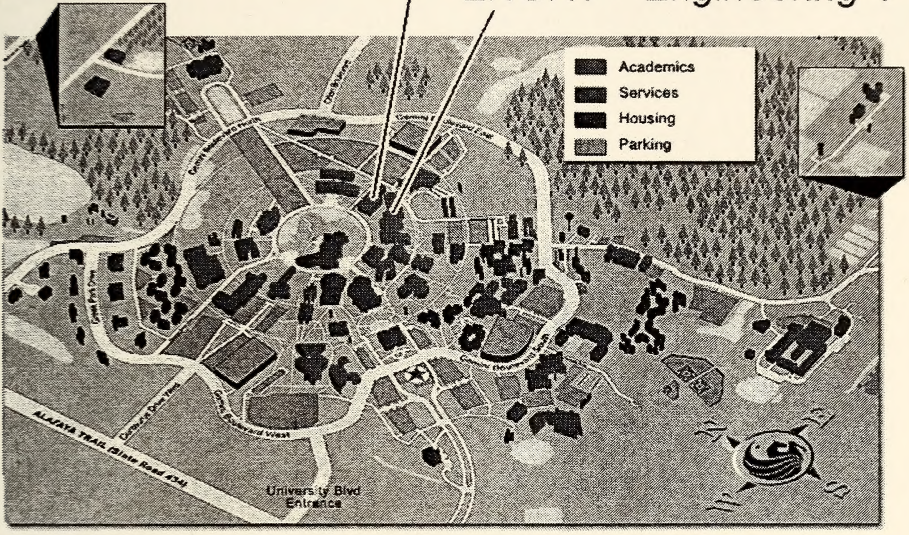

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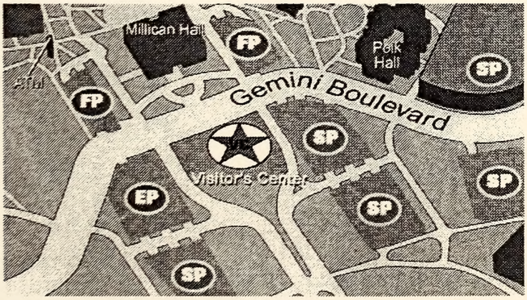

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